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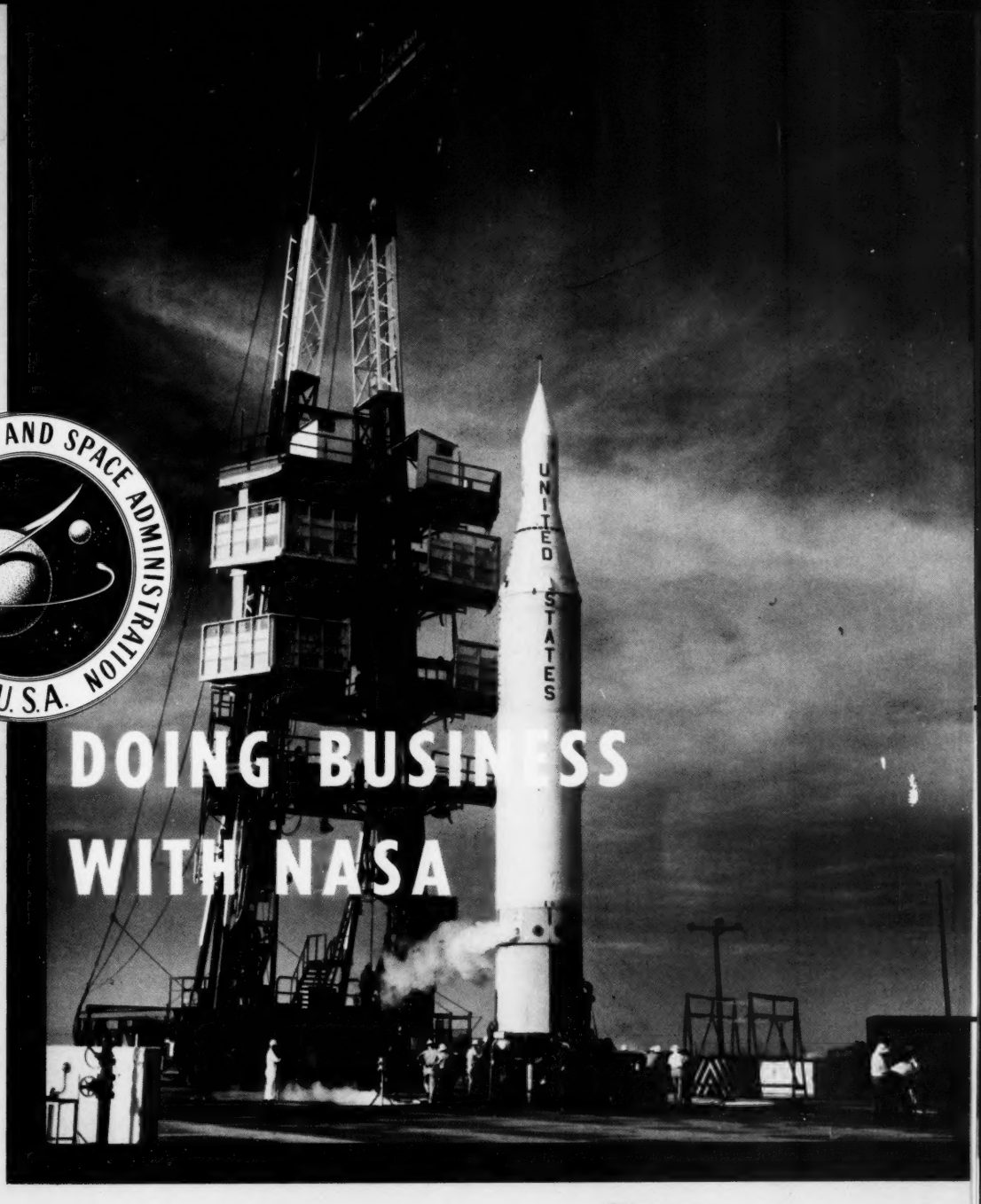

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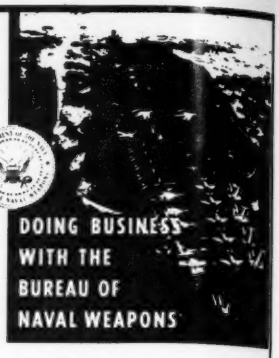

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May	Army Ordnance
June	Air Materiel Command
July	Navy ASW Program
Aug.	Navy Astronautics Program
Sept.	Army Signal Corps
Oct.	Army R&D Program
Nov.	Mutual Security (ICA) Program
Dec.	Dept. of Defense

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MARCH 1960

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JUNO II ready for NASA launch.

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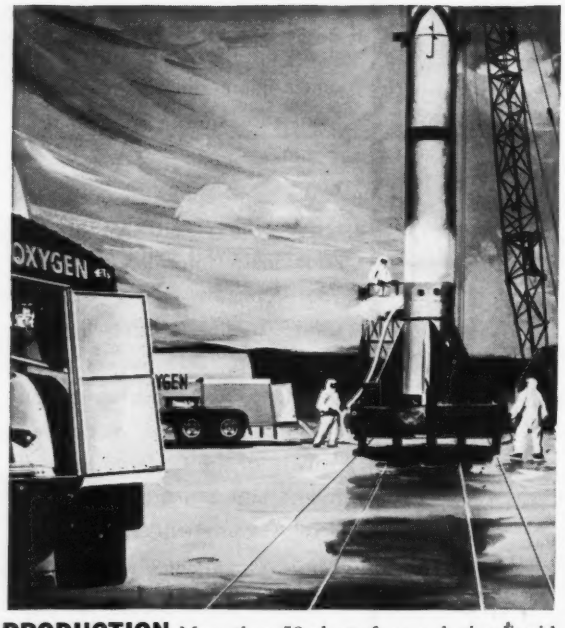

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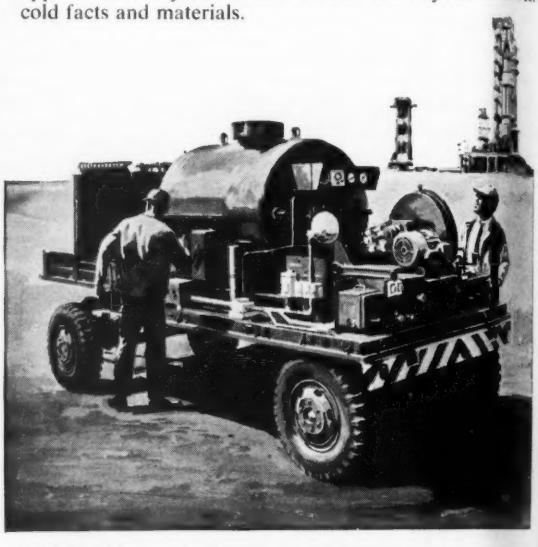

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THE WASHINGTON REP REPORTS

QUESTION:

What is the first thing you would do if you somehow suddenly became Secretary of Defense of the United States?

Mr. John R. Ward
Vapor Heating Corporation
734 Fifth Street
Washington 5, D. C.

One of the first things I would do, if the authority were vested in me, would be to institute immediate unification of all the military services, maintaining the present divisional status of the Army, Air Force, and Navy. By this, I mean there would be an Air Force branch, a Marine branch, and a land branch of a unified service. *There would be a consolidation of all the many research activities and job requirements (bookkeeping, records, accounting, etc.).* Too many of our military personnel are tied up with nonsensical and unimportant tasks which could readily be handled by automated equipment relieving the basic military for military operations and maintaining a single organizational staff rather than three, four, or five different organizational staffs to do the identical job. I believe that a unification of services would amount to a tremendous decrease in the dollar expenditure now wasted by duplication and triplication of effort. I suspect it would amount to a better bookkeeping system where we would balance our total expenditure against the money available from a balanced budget. It is not a question of getting more and more money in order to have a balanced budget, but it is rather more economically and judiciously spending the available dollars to accomplish the desired objectives.

Col. P. J. E. Janssens
Air Attache, Netherlands Embassy
1470 Euclid Street, N. W.
Washington 9, D. C.

I would definitely *curtail public information* with regard to U. S. military capabilities, new developments, and military concepts.

Mr. G. M. Riveire
Goodyear Tire & Rubber Co.
Suite 902, Ring Building
Washington 6, D. C.

An immediate exploration into methods of accelerating research and development activities by industry in all phases of defense. Much emphasis has been placed on the need but more effort should be assigned to an examination of the incentives which will attract a more comprehensive participation by industry. *There have been too many instances of product development resulting in the developer's competition reaping the rewards of production contracts in initial procurement activities.* This has the obvious reaction of generating a justified reluctance and negative attitude by capable producers in the consideration of future research and development programs. The subject has too many ramifications to pursue here but it certainly deserves immediate attention.

Major P. G. Fisscher
Royal Netherlands Attache
1470 Euclid St.
Washington 9, D. C.

A combined and all-out effort in finance as well as in research and development of aerospace technology and production of spacecraft should be made to provide the U. S. with the capability to be on top in regard to the planetary exploration and to be successful as far as this applies to military uses.

Mr. Frank Flower
Thompson-Ramo-Wooldridge
Moreschi Building
905 16th Street, N. W.
Washington 6, D. C.

I would stay away from the Pentagon and Washington, D. C. until I had read the Hoover report and completely and thoroughly understood it. Then, with slight modifications, I would make that portion of the Hoover report a keystone of my administration.

Mr. C. W. Hayes
Celanese Corp.
1026 17th Street, N. W.
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Seek a legislative package strengthening the Department of Defense and abolishing the Departments of Army, Navy, and Air Force; *substituting a strategic retaliation force, an offensive force, and a defensive force* composed of such land, sea, and air elements as world power conditions require. Establish concurrently a civilian career industry-contractor-weapons system administration co-equal with the military mission oriented forces which would each retain a warfare support logistical corps.

Mr. A. S. Pawling
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I would TRY to effect unification of the military services and co-ordination of their respective activities towards the objective of eliminating DUPLICATE development costs on military projects and establishing greater efficiency in planning stages of our protective military program. This, if successful, would react to the benefit of the American taxpayer in the minimum measure of considerably in excess of $1 billion annually. *It also would eliminate bickering among our services for their selfish spots in the sun.*

INTERPRETIVE DATA

by Harold Helfer/DATA

OUR SAMMY WON'T START A FIGHT

THERE are two philosophic outlooks. One is to seek to overcome and obliterate all your problems, whatever they may be. The other is to resolve yourself to live with them.

The first view is undoubtedly the most glorious and scintillating, but the second is the more realistic.

If you can keep this in mind, you perhaps have the best perspective in regarding the raging "missile gap" controversy.

It would be wonderful to say, all right, everybody, let's get going, let's all pitch in and keep at it, giving it all we've got, until we've not only overtaken those dadblamed Russians in missiles but even surpassed them.

But it would be more realistic to realize that, no matter what we do, there'll always be a Russian problem we'll have to live with—in fact, at least two.

For the very hard core fact is, as long as we and the Soviets exist on this sphere, as long as we each champion the opposite way of life that we do now, not only will it be extremely difficult to eliminate Russia as a menace but *the Soviets will always have certain advantages over us that we can never overcome.*

One of the elements in the controversy is whether we should try to match the Russians missile for missile or be content just to have the deterrent we hope will cause them to refrain from attacking us. Actually, though, the only thing we can have is the deterrent.

The advantage of instituting a surprise attack, of taking the initiative, will always be denied us. We are a democracy. We have to declare war. We can only set up a shield against any potential enemy and try to build the defense that will enable us to muster what it takes to strike back effectively after the first lick has fallen against us. All our missiles and rockets, no matter how many, what range or speed, are *deterrents,* being created not to attack anyone but for exactly the *opposite* purpose, the hope that their existence will mean that we will not have to use them.

Therefore, the basic question, in evaluating our strength against any other nation, is always whether we have the deterrent capacity. Nothing else really matters. We must always be the John L. Sullivan who is a gentle fellow at heart, never starts anything, no matter how many dirty looks he gets or how much insidious mutterings he hears, but who has such a corking good counterpunch that no one is too anxious to overstep the bounds and actually take a swat at him, even the very sneaky-type variety.

* * *

What worries the people who understand this is not that the Soviets have more missiles than we do but that we are entering a period when our deterrent factor will be cut to a pretty fine line. They wouldn't care if the Russians had 1000 operational super missiles to only 100 of ours, if they felt that this gave us enough power to devastate Russia if she ever started anything, with the hope that this also would mean that Russia wouldn't be foolish enough under these circumstances to ever start anything in the first place.

Actually, they wouldn't much care if we didn't have any missiles at all, if we had the manned planes that could serve as our Sunday punch. And the fact of the matter is that we may always need some manned planes, no matter how many missiles we may finally accumulate. Because the USSR has another advantage over us which there probably is no way of ever overcoming. *Democracies just can't keep secrets as well as totalitarian nations.* The Russians are bound to know a great deal more about our defense set-up than we know about their military picture. They could undoubtedly pinpoint more of our vital military and missile bases than we could ever hope to match. And missiles don't do you very much good unless you know exactly where it is you want them to go when you send them off. But a vehicle maneuvered by human beings can seek out a likely target after the mission has got underway.

Anyway, it is pretty generally agreed at the Pentagon that we'll be entering our most critical period militarily with Russia in the next few years, particularly probably in the 1961-1963 period. That's because by then, the best guess is, the Soviets probably will have some 300 powerful missiles, in place, aimed and ready to be launched, enough to completely devastate us, our military bases and our economy. Will we have enough of a deterrent going for us to keep Russia from being tempted to unleash herself? That's why, of course, the Air Force has suggested keeping a powerful squad of our bombers in the air at all times, to let the Soviets know that we do have the counter-punch thrust if she starts anything.

Some three years from now, the feeling generally is, we'll be able to breathe a little easier. We should have a good early warning system in our favor, a number of POLARIS missiles at their undersea stations aimed at Russian vitals and enough ICBMs of our own, staked out and scattered so that a goodly number of them would be able to survive any Soviet attack and launch an offensive of their own.

Whether we'll ever be able to match the Russians missile-for-missile—or whether we'd ever really want to—is another matter. If we keep strong enough to dissuade any bully from getting out of line with us, that undoubtedly would be considered a most satisfactory military posture on our part.

There is, however, another dimension involved too. It is perfectly possible to make ourselves militarily secure, so secure no one would ever dare pull a Pearl Harbor on us, and still become a second rate power.

This would happen if we allowed ourselves to be outstripped in the field of science, knowledge and exploration. If Russia lands a man on the moon first, it would be as great a triumph as if she took over Manhattan. Actually, of course, a moon landing would be a much more dazzling and memorable feat than taking over New York, if the Gothamites will forgive us for saying so.

Admiral Arleigh Burke, Chief of Naval Operations (L), has coffee with DATA's Harold Helfer during recent Pentagon interview.

PATENT RIGHTS

A matter that has been smoldering for quite some little time underneath government-industry relationships, particularly in space matters, seems to be headed for the explosive stage.

It revolves around the matter of patents. When a private concern has completed a research project in which government funds were used, what about any new devices or formulas that may have been developed . . . is the company entitled to the patents?

The attitude of the private concerns have been, certainly, we're entitled to the patents, we developed the things, didn't we? The Government's reaction though has been, yes, but public money was used. Therefore any constructive ideas and devices that have come out of these projects should revert to public domain and, in effect, "belong to everyone."

What is bringing this matter to a showdown now is that concerns have got their back up about this and have intimated to the National Aeronautics & Space Administration they won't sign any more contracts unless the patent rights accrue to them.

The White House has been coming around to the private company's point of view, maybe not too happily, but for the sake of harmony in Government-contractor relationships, in the interest of the best possible results in our space efforts. And it has begun to push for Congressional legislation to do away with these patent restrictions. But there's no doubt that resistance will be encountered to the idea in Congress.

The immediate battleground will concern NASA matters, whose work is so vital and whose contractors are applying maximum pressure now to have these patent restrictions lifted . . . and it was specifically written into the law that under NASA contracts, just like Atomic Energy Agency ones, all ideas that are developed become public property, available to be taken advantage of by anyone.

The companies are making it plain that they are not seeking to get any more money out of the Government by being allowed patent rights, that the Government would retain royalty-free licenses to use any patents developed on any of these Government-financed projects. What the companies are objecting to is private individuals or concerns being able to come along and pick up these ideas to use as they see fit, without having to pay one single red copper cent. They argue that the concept of private enterprise is involved here.

In Defense Department contracts, companies generally are able to retain patent rights. But there are some congressmen who aren't particularly overjoyed about this either, feeling that anything developed by taxpayer's money should belong to any taxpayer, regardless, and these lawmakers can be expected to fight any attempt to restrict the patents in which they have not been restricted in the past.

Before the shooting is over, no doubt the question of whether Defense contracts should allow for patent restrictions also will come up. There could be a major battle on the whole question of patent rights in every area of governmental contract work, and it would seem that sooner or later, and perhaps sooner than later, Congress will have to come to a clear and profound decision on this basic matter.

THE B-70 CUT

The decision to drop the B-70 program was not altogether a budgetary matter. There was the fear by the time this new super bomber became operational it would be obsolescent.

In short, the cancellation of the B-70s, as much as a money matter, reflects the feeling that we are now so deeply immersed in the missile age that any real effort in the field of manned planes is pretty much a wasted effort.

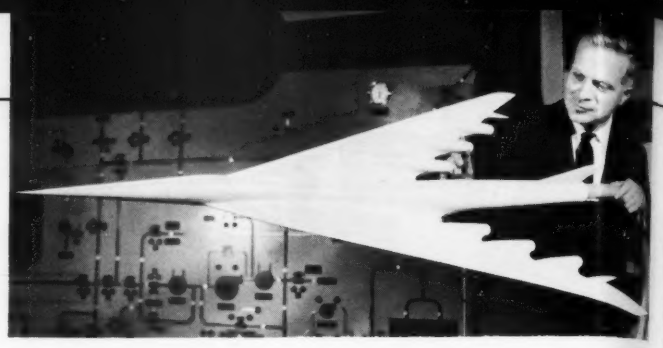
Of course, there's the realization that piloted planes will still be with us for awhile. And so there will be reliance placed on the 500 already operational B-52s while shifting more and more of our military strategy and concepts to our missiles.

But there are going to continue to be people who are unhappy about this, feeling strongly that we must still depend heavily on manned bombers . . . that, indeed, we probably shall always need piloted aircraft, not only for reconnaissance and transportation assignments, but also to take care of mobile enemy enterprises. They think, then, that it would not be amiss to have B-70s around even if our missile development became quite spectacular.

It is not insignificant that someone like Congressman Overton Brooks, who is head of the Space & Aeronautics Committee and was vice chairman of the Armed Services Committee, and who is by no means un-orientated to the value and meaning of missiles, told DATA that he has foreboding about the cancellation of the B-70 program.*

**Ed. note: see "Washington Rep Reports" Jan. 1960 DATA.*

He, and other congressmen too, are going to be inclined to take a hard look at the decision to halt



NASA scientist Richard T. Whitcomb, man who discovered Area Rule ("Coke Bottle" fuselage) design, inspects research model of supersonic jet ransport prior to tests in Langley Wind Tunnel.

work on the B-70s. *It is within the realm of possibility that the B-70, or something akin to it, will be reactivated after all. If not, you can know that we have stepped squarely out into the missile age, burning practically all our conventional bridges behind us.*

SAMOS, THE PEEPING TOM SATELLITE

To understand the basic problem behind SAMOS . . . *why it probably is destined to become the most controversial of all our man-created satellites* . . . you must know that SAMOS wasn't always called SAMOS.

It was first called SENTRY. It was changed not because the concept, notion or mission about this satellite had changed one whit, but for political reasons. SAMOS sounded a lot less military-like and provocative than SENTRY.

The purpose of this new satellite, simply put, will be to spy on Russia from the cosmic regions. Experts say there's no doubt we can put a satellite into orbit, probably within two years, that will be able to tell us much about the USSR's military posture, and leanings.

The Soviet Union is adamantly opposed to this, as you might suspect, but what concerns Defense officials is that some American leaders have their doubts about it too. *They think the USSR may have a point, that maybe it isn't cricket to be a sky spy over somebody's territory, that the USSR could create strong world-wide propaganda in her favor in protesting this spy satellite.* And, if the Soviets were to say to us, as apparently they may be willing to do, "All right, Dwight, don't participate in any of this cosmic spy business and we won't either" . . . wouldn't that be fair enough? Some U. S. leaders think so.

It all sounds so reasonable, so much so it could be fatal to us . . . at least, so Defense strategists feel. They are convinced that it is of the utmost importance that we *do* have such reconnaissance satellites in orbit, that it would not only give us the warning we need if Russia is moving aggressively, but would be a deterrent to keep the Soviets from embarking on any such adventure.

The reason this reconnaissance is so much more important to us than to the Soviet Union is that, this being a democracy, our pattern of life being so much more informal, the Russians know a great deal more about us and our military establishments, missile bases, and so forth, than we do about the USSR.

It may not be nice to say things like this, to spell things out so baldly, but these are the facts of life.

IN SHORT . . .

Sign at CHINFO, Pentagon:

"There Is More Power In The Open Hand Than In The Clenched Fist."

Glossary of Government job types making the rounds of the Pentagon:

* * *

Office Space: *Civil Servant . . . has small desk in large outer office. Bureaucrat . . . has large desk in small inner office. VIP . . . has large desk in large inner office. Egghead . . . has brief case.*

* * *

Lunch: *Civil Servant . . . eats in building cafeteria. Bureaucrat . . . has two-hour, two martini lunch downtown. VIP—has two-hour, two-martini lunch in private dining room. Egghead . . . brings own lunch in briefcase.*

* * *

Cocktail Hour: *Civil Servant . . . has two beers at home. Bureaucrat . . . attends big cocktail party given by lobbyist. VIP . . . attends small cocktail party by lobbyist. Egghead . . . has two glasses of wine at home.*

* * *

Receptions: *Civil Servant . . . not invited. Bureaucrat . . . invited. VIP . . . stands in receiving line. Egghead . . . invited but doesn't attend.*

* * *

Press Relations: *Civil Servant . . . writes letters to editor. Bureaucrat . . . leaks news to reports. VIP . . . hold conference. Egghead . . . buys newspaper.*

* * *

Congressional Hearings: *Civil Servant . . . carries bureaucrat's briefcase. Bureaucrat . . . testifies before subcommittee. VIP . . . testifies before full committee. Egghead . . . tells VIP what to say.*

Observation of the Electric Institute:

America is no longer a melting pot — it's a pressure cooker.

Basic research is what I'm doing when I don't know what I'm doing.—Wernher von Braun

—HAROLD HELFER

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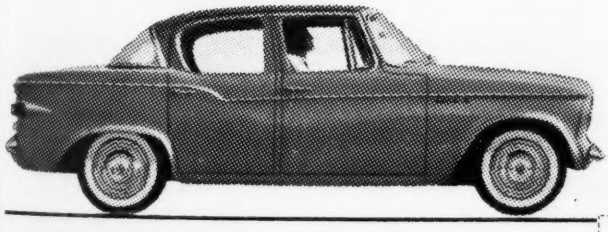
2. LOWEST OPERATING COST PROVEN by actual records of fleet operators all over the country. "Save $40 a month on each Lark" (equipment sales company, California)—"Savings on each cab would buy a new cab in 2½ years" (taxi fleet, Massachusetts).

3. LOWEST MAINTENANCE COST PROVEN by fleet records. "Saving 33%" (taxi fleet, New York)—"Over 25,000 miles on each Lark in severe Police service—with minimum maintenance" (police department, Indiana).

4. LOWEST REPAIR COST PROVEN by fleet records "2.1 mils per mile, against 3.2 mils per mile" (car rental, Colorado)—"No repairs, no new parts, after 10,000 miles on each Lark" (telephone company in Oregon).

HOW DO THEY COMPARE? (specific figures)	STUDEBAKER
Miles per Gallon	24.5 in rental service
Oil Consumption	None between changes at
Routine Maintenance	5.2 mils per mile, vs. 78.4 m
Repair Work	2.1 mils per mile, vs. 3.2 m
Parts	1.5 mils per mile, vs. 9.0 m
Tire Mileage	14,000 miles per set, vs. 12,500 m
Insurance Costs	12% less
Space Saved in Parking Area	5 cars in the space of 4 others

5. LOWEST INSURANCE COST PROVEN by fleet operators' records (either self-insured or with better experience ratings because of low Lark claims). "Have lowest available rate" (taxi fleet, Minnesota)—"Lark costs 20% less than others" (bakery fleet, Arkansas).



6. BEST DRIVER ACCEPTANCE PROVEN by fleet owner reports. "In all cases our renters have been very pleased with the performance and appearance of The Larks, and we are getting repeat requests for them, the surest sign of satisfaction" (car rental, Ontario)—"All drivers prefer Studebakers to all other units" (taxi fleet, Wyoming).

We invite you to make us prove these advantages — from records of governmental and business organizations. Send this coupon! →

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COMPANY_____

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The expansion of human knowledge of phenomena in the atmosphere and space;

The improvement of the usefulness, performance, speed, safety and efficiency of aeronautical and space vehicles;

The development and operation of vehicles capable of carrying instruments, equipment, supplies and living organisms through space;

The establishment of long-range studies of the potential benefits to be gained from, the opportunities for, and the problems involved in the utilization of aeronautical and space activities for peaceful and scientific purposes;

The preservation of the role of the United States as a leader in aeronautical and space science and technology and in the application thereof to the conduct of peaceful activities within and outside the atmosphere;

The making available to agencies directly concerned with national defense of discoveries that have military value or significance, and the furnishing by such agencies, to the civilian agency established to direct and control non-military and space activities, of information as to discoveries which have value or significance to that agency;

Cooperation by the United States with other nations and groups of nations and in the peaceful application of the results;

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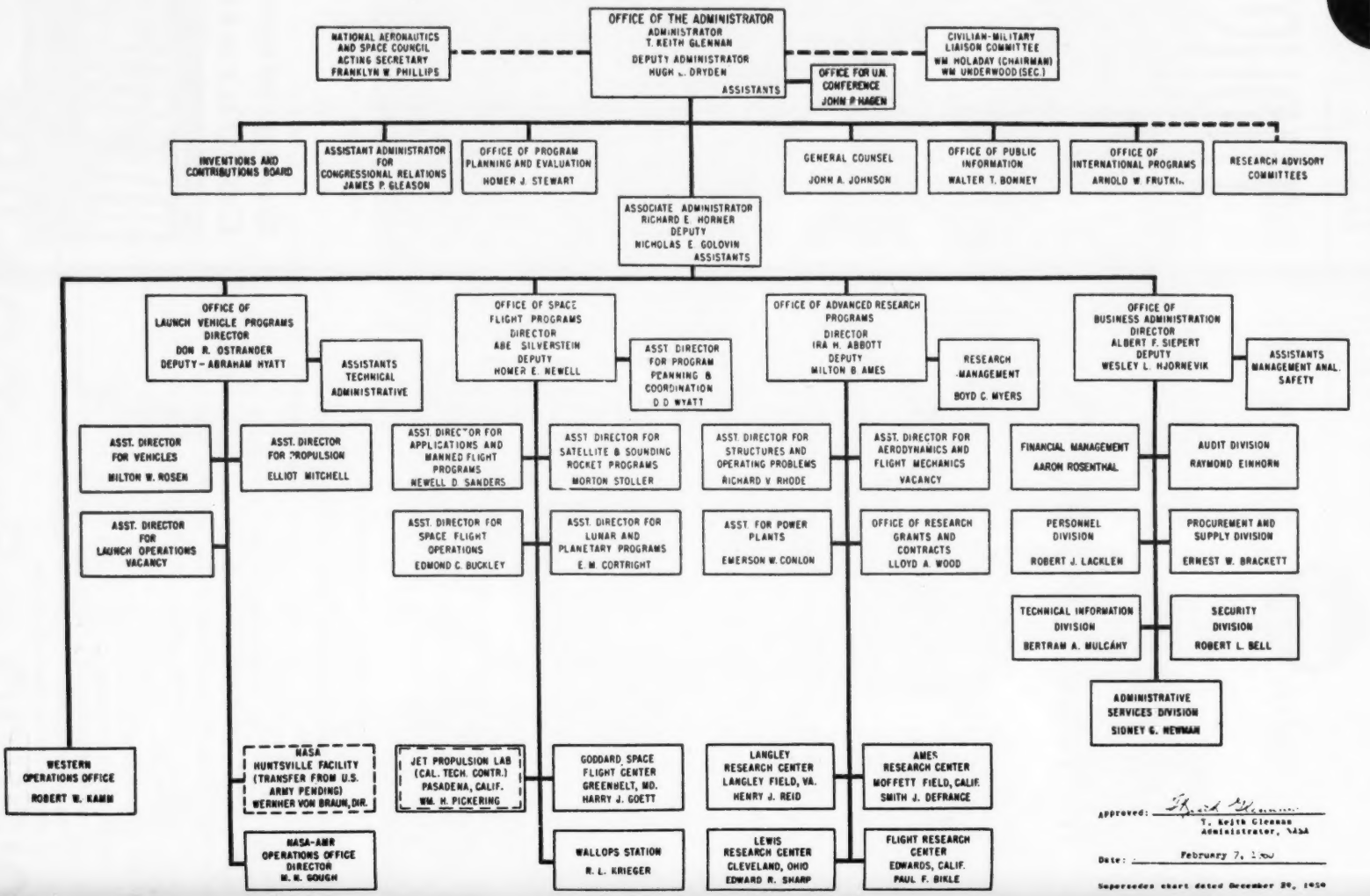
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Staff Directory Organizational Chart



Approved: T. Keith Glennan
T. Keith Glennan
Administrator, NASA

Date: February 7, 1960

Supersedes chart dated December 30, 1959

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1961 ESTIMATES
RESEARCH AND DEVELOPMENT PROGRAMS

Program	Fiscal Year 1959	Fiscal Year 1960	Fiscal Year 1960 Supplemental	Fiscal Year 1961
AERONAUTICAL AND SPACE RESEARCH:				
Support of NASA plant	$ 1,097,651	$ 22,684,000	—	$ 51,345,000
Research grants and contracts	3,028,000	4,950,000	—	10,000,000
Support of JPL plant	8,156,500[1]	—	—	—
SCIENTIFIC INVESTIGATIONS IN SPACE:				
Sounding rockets	3,556,170	8,811,000	—	8,000,000
Scientific satellites	21,305,114	23,813,000	—	41,700,000
Lunar and planetary exploration	31,882,607	49,000,000	—	45,000,000
Vanguard	21,943,582[1]	—	—	—
SATELLITE APPLICATIONS:				
Meteorology	987,550	7,930,000	—	20,700,000
Communications	3,574,806	3,170,000	—	5,600,000
MANNED SPACE FLIGHT	46,416,333	74,962,000	$ 12,000,000	107,750,000
VEHICLE SYSTEMS TECHNOLOGY	1,903,651	6,737,000	—	21,200,000
SPACE PROPULSION TECHNOLOGY:				
Solid rockets	615,898	3,785,000	—	2,800,000
Liquid rockets	15,978,589	30,328,000	—	40,000,000
Nuclear systems technology	3,810,496	6,000,000	—	10,000,000
Space power technology	—	4,814,000	—	8,000,000
VEHICLE DEVELOPMENT:				
Scout	6,048,000	2,800,000	—	—
Delta	12,927,417	13,300,000	—	12,500,000
Vega	14,291,494	4,000,000	—	—
Centaur	4,000,000	37,000,000	—	47,000,000
Saturn	34,000,000	77,000,000	—	81,008,000
TRACKING AND DATA ACQUISITION	3,095,674	16,266,000	—	32,550,000
TOTAL	$238,619,532	$397,350,000	$ 12,000,000	$545,153,000

[1] Funded under program activities in 1960 and 1961.

APPROPRIATION SUMMARY

	Salaries and Expenses	Research and Development	Construction and Equipment	Total
APPROVED, FISCAL YEAR 1959:				
Independent Offices Appropriation Act, 1959; P.L. 85-844	$ 78,100,000	—	$ 23,000,000	$101,100,000
Supplemental Appropriation Act, 1959; P.L. 85-766	5,000,000	$ 50,000,000	25,000,000	80,000,000
Second Supplemental Appropriation Act, 1959; P.L. 86-30	3,186,300	—	—	3,186,300
Transfers from DOD (72 Stat. 433)	—	154,619,532	—	154,619,532
TOTAL	$ 86,286,300	$204,619,532	$ 48,000,000	$338,905,832
APPROVED, FISCAL YEAR 1960:				
Supplemental Appropriation Act, 1960; P.L. 86-213	$ 91,400,000	$335,350,000	$ 73,825,000	$500,575,000
Appropriation transfer; P.L. 86-213	—	—15,000,000	15,000,000	—
TOTAL	$ 91,400,000	$320,350,000	$ 88,825,000	$500,575,000
REQUESTED, FISCAL YEAR 1960:				
Supplemental estimates	—	$ 12,000,000	$ 11,000,000	$ 23,000,000
REQUESTED, FISCAL YEAR 1961:				
Regular estimates	$167,560,000	$545,153,000	$ 89,287,000	$802,000,000

*These figures do not reflect a $113,000,000 supplemental request for FY 1961. This allotment would be divided like this: $90,000,000 for a speed-up of the SATURN missile's first stage—$8,000,000 for the missile's upper stages—$15,000,000 for an engine for the NOVA missile.

Forgotten Professor

AFTER WORLD WAR II when German scientists were queried on their V-2 rocket by US Army technicians, the Germans would say, "Why don't you ask your own Dr. Goddard?"

Most people still aren't aware today that the "father of rocketry" was not some Hitler stooge or some Sovietized physicist but a quiet, scholarly American professor and that the birthplace of the rocket was not the Rhine plateau or Russian steppes but Worcester, Massachusetts.

Professor Robert H. Goddard just happened to be a man who was born too soon. There are scientists who believe that if this country had followed this Worcester man's lead we would not only be well ahead of the Russians in space but may very well have *men* on the moon by now.

The multi-stage rocket that zooms satellites into orbit is regarded as something ultra-revolutionary, something uniquely of this decade, but actually Professor Goddard patented a multi-stage rocket way back in July, 1914!

For the dime it would have taken to buy from the US Patent Office a copy of the patent of this rocket developed by this tall, scholarly professor, American military technicians could have had just about all the basic information that any of the World War II German rocketeers could have told or sold them.

As a matter of fact, the multi-stage rocket that Russia used to thrust the first satellite into space was not too different, including the type of liquid oxygen fuel used as the propellent agent, than the one that Goddard had envisaged and worked on.

You couldn't say that the gangling physics professor at Clark University was exactly a prophet without honor—Lindbergh and the Guggenheims could see the significance of his work and were in his corner —but if the country as a whole could have grasped his purpose and shared his vision the United States today might be far ahead in the international missile race instead of where we are and the course of history might be running in an entirely different direction.

Professor Robbert H. Goddard

It was back in 1907, when he was only 25, that Robert Goddard first began experimenting with outer space flight. He wrote an article back then suggesting that the heat from radioactive substances could power rockets into interplanetary space. But the manuscript was turned down by the leading popular scientific magazines . . . *on the ground that it was too fantastic!* A couple of years later he proposed the use of hydrogen and oxygen as fuels for multi-stage rockets. No one paid any attention to him.

The lean professor finally developed a multi-stage rocket on his own and patented it.

It wasn't until two years later though . . . in 1916 . . . that he finally created some real attention—at least in rarified scientific circles. He'd written "A Method of Reaching Extreme Altitudes," in which he took the position that there wasn't any reason why a rocket couldn't travel beyond earth's atmosphere, even reaching the moon or planets. *The world was then engrossed by a new sensation, the flying machine, but way back then the professor from Worcester could see that the propeller-driven aircraft had its limitations and that the rocket was the real space traveler of the future.*

All this research that he was doing left Goddard an impoverished man but the Smithsonian Institution was impressed by the intense belief he had for what he was doing and gave him a grant of $5000 to continue this work. Later, induced by Lindbergh, the wealthy Guggenheims also contributed financially to the professor's experiments.

In 1926, ten years after the Smithsonian grant, Goddard got off an 8-foot rocket. It went only a few hundred feet into the air but it was the world's first flight of a liquid fueled rocket.

Three years later he got off an 11½-foot one—with serio-comic results. This one veered unexpectedly and landed in a populous sec-

tion of Worcester. No one was hurt fortunately but the excitement it caused was quite tremendous. The first reaction of the startled citizenry was that a plane or "something from somewhere" had crashed. Goddard was finally hauled up before the state fire marshal and sternly told that he must stop this nonsense of trying to reach the moon.

Deciding that New England was too crowded a place for his ever-expanding rocketry ideas, he took off for New Mexico—*antedating the missile proving ground there now by more than two decades!*

If the professor had received one-thousandth the support that any of our missile and rocket efforts get today, there is no telling how far out in outer space we might be today. As it was, he never interested the US Government in his space ideas at all. He did help develop a form of jet assisted takeoff for planes but when it came to rocket work all he got from Uncle Sam was a cold shoulder.

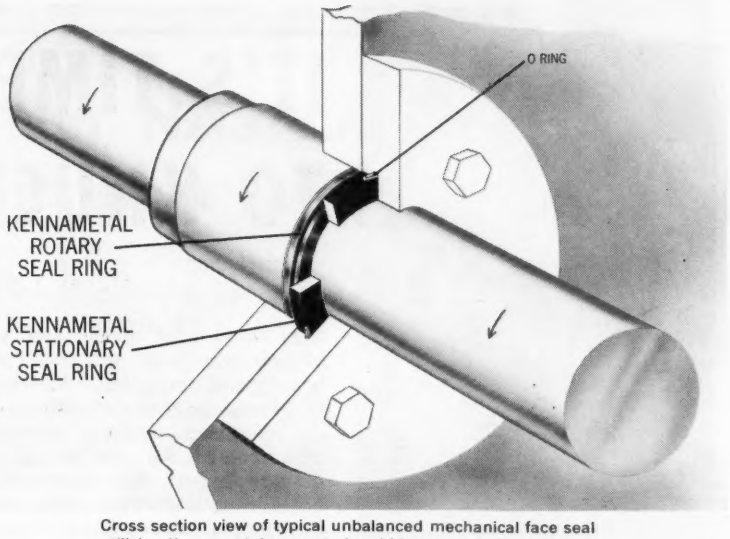
When Hitler loosed his V-2 rockets on London in a desperate bid to wrest World War II victory, one or two that failed to explode were rushed to this country for examination. They were found to duplicate the rockets that the Clark University physicist had fired in New Mexico almost a decade earlier.

Dr. Werner Von Braun, the German rocket expert who is now directing major rocketry programs for this country, acknowledges: "Dr. Goddard was ahead of us all."

Lasting proof of the Worcester professor's genius in rocketry lies in the 133 patents in that field that were granted him. He also is the inventor of one of World War II's best-known weapons, the "bazooka."

Although Professor Goddard died in 1945, his work, curiously enough, has been going on . . . thanks to his dutiful wife. She has finished carefully deciphiring thousands of diary notes and technical reports on tests spanning nearly a half century of her husband's research on rockets. This material makes up 27 indexed volumes and may yet be of inestimable value in this country's outer space efforts.

The quiet, scholarly but dedicated Worcester professor may play a part in changing the course of history yet. ■



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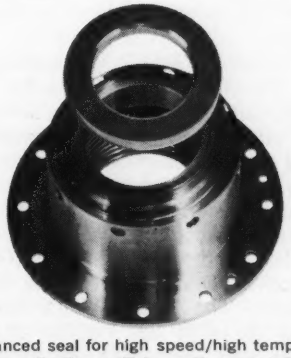

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CAIDIN

IT'S TIME TO KNUCKLE DOWN

by Martin Caidin/DATA

DATA is proud to announce that its Feature Editorials Editor, MARTIN CAIDIN, has just been accepted into the Air Force's famed Thunderbirds *aerial precision team as Thunderbird Number 8. Recently Mr. Caidin spent several weeks living and flying with the Thunderbirds, traveling throughout the United States with the team, as he collected material for a book on the world's most outstanding jet precision fliers. In a move unprecedented for the Thunderbirds, they accepted Mr. Caidin into their ranks, designating him as Number 8. Mr. Caidin is shown here before the F-100F fighter in which he flew with Captain Richard Crane, Thunderbird No. 7, in aerial maneuvers with the team. —Ed.*

I THINK THAT the sentiments I'm about to express in this editorial are long overdue . . . not only on my part, but also in reference to my many contemporaries who by their participation in our fields have earned the right to comment publicly on America's space program.

Its appropriate that the NASA issue of DATA have these comments. The fur has flown thickly, and the dust lies heavily on the floor after some old-fashioned political knock-down-and-drag-out slugfests as to what people and what organization runs America's business in, and for, space. We—all of us—have discussed, threshed out, cut to pieces, argued, evaluated, criticized, praised, condemned and dragged out of the closest every possible skeleton that might reflect divergent views upon the wisdom of choice of what organization we bet our space chips on.

There are those who fought bitterly—and honestly—for ARPA, or its equivalent, stressing the need of the military organization like the Manhattan Project that, by proof, has delivered the goods. With equal fervor and with equal validity of argument, others have championed the cause of NASA, especially because of its foundation that rests upon the superb structure and accomplishment of the former NACA.

All this is fine for luncheons and press interviews and magazine articles, and it makes great material for panel discussions on television. But we are—or should be—past that stage of the game by now.

Whether or not we are all in agreement upon NASA as the best *type* of organization on which to rest our space hopes for today and for tomorrow no longer is important. It's a point that has been flogged to death, and like yesterday morning's oatmeal, it isn't very appetizing any more.

NASA is the organization which has been selected by the Congress of the United States as our national space agency. The thinking behind that selection didn't originate within our political chambers. It grew from millions of words of testimony of the best authorities in our nation. It was built upon what we considered the best opinion we had. It had injected into it all manner of consideration, including political, scientific, technological, and other reasons.

NASA is the team we have selected. It's time to stop bickering or continuing our Monday morning quarterbacking. Anyone can have 20-20 hindsight; to see best into tomorrow. NASA now needs vision from every one of us in the field to provide assistance.

Personally, I don't *know* if NASA is the best way of creating the strength we need in space technology. *I don't know if there is any better way, however,* and I for one am ready to beat the drums to the tune that its time to quit the noise of argument strictly for the sake of continuing the noise, and that *NASA needs—and must have—the support of us all.*

This is our team—let's get behind that team. It's as simple as that. NASA is staffed with the best scientists in our country. It is a national instrument of research, development, and contention. This is the national decision.

We won't help NASA—or the United States—to reach its goals in space by continuing the sniping. We *can* help by drawing together along a collective front and giving NASA the support it needs to operate most effectively and with the greatest possible opportunity for success.

Whenever the United States has finally committed itself to a program its been full bore all the way, and we have never even come close to failing. This is the situation with NASA. We've picked this team through our elected representatives, we've decided that this is the way we're going to play the ball game.

It's time, really, to quit the grumbling and fighting, and act together along that concerted front. NASA—which is another way of saying the United States—deserves no less.

—MARTIN CAIDIN

Dr. T. Keith Glennan, NASA Administrator, Answers Questions from DATA

Dr. T. Keith Glennan

1. What major scientific breakthrough, above all others, would you most like to see take place?

We have an aggressive, comprehensive and well-balanced program laid out. It is difficult to say that any one area is more important than another. Our first concern today is with propulsion, to develop large booster systems—systems with great initial thrust and suitable upper staging. Any advances in this area would help us considerably but it is unrealistic to pin our hopes on scientific breakthroughs taking place.

2. What is your best guess on when the United States will have a man on the moon?

There are so many "ifs" involved in a question of this sort that I would prefer not to make guesses. It will take many years.

3. What planet are we likely to try to reach first and what is your thought on when we're likely to have any success with this?

THE NATION'S $103,000,000 GREEN FEE

On a Pacific Coast golf course, T. Keith Glennan, head of NASA, buttonholed President Eisenhower, spoke to him of the urgent need for more money to help get SATURN missile, deep outer space probing project, off the ground.

Eisenhower listened intently, didn't say too much, but promised Glennan he'd think about it. The next day or so, the President, on his way back East, stopped in Denver for a little while and he promptly got in touch with Glennan by phone. He wanted a fill in on a few points. From Denver, before hopping back aboard plane, Eisenhower also talked to his staff in Washington on this matter.

And this is the story of how an additional request for NASA, especially for SATURN, came to be placed in the budget.

We will attempt exploratory probes in the vicinity of both Mars and Venus within the next few years.

4. Do you think it is possible that the challenge of space may help get the minds of Russia and the U. S. off their earthly squabbles and wind up making for better relations and co-operation? Or is it more likely that space will just heighten the competition and rivalry between the two countries?

The first part of your question is one for the State Department, not NASA. Our charter directs us to explore space for the benefit of all mankind and that, you will concede, is a rather large order. As to the second part of the question: a certain amount of competition or rivalry, if you will, probably always will exist between scientists. It is an altogether healthy stimulus when properly directed.

5. Do you look for the nation's private industry to expand their efforts in space matters or for the U. S. Government to take over more and more in this field or for the ratio and situation to be about what it is now?

I doubt that industry will invest many private dollars in space research and exploration. I do not advocate the enlargement of the in-house effort of the Federal Government by any substantial amount. It follows, then, that the ratio between government activities and those undertaken by industry will remain essentially unchanged with the scale of the effort being determined by the availability of Government support.

6. Do you think this nation can overtake Russia in space progress and, if so, how long will it take and what will be required of us as a nation to achieve this?

We are lagging the Russian program only in the development of launch vehicles of high thrust. With our more advanced Atlas-based boosters, such as Agena and Centaur, we should in 18 months or so be able to loft two to four-ton payloads—as much or more than the currently demonstrated Russian capability. Within five years, when we expect to have perfected the Saturn system, we won't have to take a backseat to any one. In the meantime, this nation has published more new and significant scientific information resulting from our satellite and space probe operations then has the Soviet Union. ■

NOT MUCH TO LOOK AT . . . but heaven to kiss . . .

a penetrating study of NASA

by Harold Helfer/DATA

ON THE SOUTHEAST corner of H and Vermont Streets in downtown Washington, D. C., there is a motley, dingy-looking, boarding-house-like structure which, if you have an esthetic spark in your soul, you may find an overwhelming impulse to want to raze to its very foundation and then some. No doubt contributing to the eyesore nature of this nondescript conglomeration of cheap-looking, ancient mortar is the fact that the White House is just around one corner, the Statler Hotel is around another and, further down the street, is the handsome marbled building that houses the U. S. Chamber of Commerce.

But, hold on, spare that ax and bulldozer—!

For, should you step into this ungainly structure, your eyes would feast, at a desk there, as svelte and luscious-looking a blonde as you could ever hope to see.

There is still another reason for going easy with this decrepit-looking place: For what emanates from this structure probably will be remembered long after whatever is proclaimed at the White House or enunciated at the Chamber of Commerce and it may even surpass some of the memorable doings at the Statler.

This squat building houses the National Aeronautic and Space Administration and *it is the star around which this country's prestige and future revolves.*

In a way, it is sort of fitting that NASA's headquarters should have such lowly trappings. It emphasizes how far we have to go to reach the celestial heights.

A BUSY SHOP

By its very nature, NASA is bound to become the most discussed agency in the Government. Undoubtedly, it will be the most meaningful one too. For we stand now on the threshold of man's greatest conquest, that of the universe itself, and NASA is going to be the springboard that will get us up there.

There are many critics who feel that this country isn't doing nearly as much as it should in the exploration of space, that we are, in fact, lethargic. At a recent panel of space experts in Washington, the statement was made that this nation is presently suffering "from a condition of retardation alien to the American principle of expansion and development—acute laggardness . . . we are only walking into the space age when we should be running." *But you don't get that feeling at NASA itself.*

Here you do get the sense of urgency, of dedicated people. Within the walls of this dingy building, there's a rush on. Perhaps nothing like this has happened in Washington since the early New Deal days. And the big beautiful blonde receptionist in the lobby seems to be a symbol of an awareness that the most sophisticated, the most modern means must be brought into being to meet the challenge of space.

Of course, NASA cannot carry the burden alone. The $900,000,000 it will spend in the coming year is considerably less than any of the services, yet its scope is much vaster than all these services put together. All the new Space agency can do is carry the ball . . . there's no question but it needs a strong line, particularly since Uncle Sam is way behind and this is the second half.

No one disputes that we took a bad licking in the first one, with the Sputniks and Russia's moon contact. The best guess is that we're at least five years behind . . . it will take at least that long to "catch up." *The fear is that the Russians may be widening the gap though, instead of it being narrowed.*

There are some who think it is a mistake to think of ourselves in any sort of race with the Soviets, that we should go ahead with our plans in a measured, scientifically valid way. There are others who think we should strike out in some spectacular way in order to finally take the play away from the USSR.

But the terms that bring the most controversy "Race," "Prestige," may be as much semantics as anything else. There is something gnawingly troublesome about the whole picture, from no matter where you sit, which the Russian factor only accentuates. It has really nothing to do with security or "showoffness." *It's the fact that this country, with a great pioneering past, seems to have lost its zest for adventure and the will to achieve. Here we are the dawn of man's greatest and most epochal exploration, and there isn't any Columbus. Queen Isabel (also spelled b-u-d-g-e-t) won't give up her baubles.*

NASA NOT TO BLAME FOR LAG

Although the feeling is strong that NASA's 10-year-program, which looks forward to some deep space probes, is much too modest, there is no disposition to blame NASA, as such. It is national policy. The present Administration appears to be more mindful of mundane budgetary figures than the heavenly bodies. T. Keith Glennan, NASA's head, regarded as a "good man," isn't too happy about the wherewithal NASA has been getting and when he leaves NASA this summer, as may happen

if he elects not to stick it out to the end of the Eisenhower Administration, then he is liable to shed his cloak as an Administration "Team Man" and get a few things off his chest. Even so, no one expects any change during this budget-minded Administration.

It is also recognized by those close to the space picture that NASA hasn't really been 100% weaned yet. It is still tied to its military navel cord and, as a matter of fact, there is an inclination in the Department of Defense not to let go. Gen. John B. Medaris, who was head of the Army's missile agency at Huntsville until he retired, has attacked the concept of NASA bitterly and thinks all space effort should be under military auspices.

NASA, IF LEFT TO GROW, WILL OVERSHADOW MILITARY

There's no doubt that, while much of its work, for some years to come anyway, will be of military interest, that NASA will develop into a distinct entity of its own, that it will someday surpass the military in size and undertaking. It may very well become the No. 1 branch of the Government and sooner than most people realize. *It is distinctly conceivable that there will someday be a Secretary of Space in the Cabinet.*

GROWING PAINS FOR NASA

But there'll be growing pains for NASA. The sad facts are:

The Soviets intend to send a payload to the planet Mars this fall. NASA's plans call for making a similar attempt in November, 1962 —if all goes well.

The Russians, all signs indicate, will launch a man into space this year and, the hard facts further indicate, stand a good chance of success. We'll be lucky if we're able to duplicate the feat by the latter part of 1961.

Rocket-boosted glide bombers capable of orbiting the earth are considered a feasible accomplishment by the Soviets within a year or two. Our X-15 non-orbiting rocket plane still is many months away from maximum altitude testing, while our answer to the Russian T-4A orbiting bomber, the Dyna-Soar, is really just a conversational piece at the moment. And so it goes.

NASA HAS PLANS

NASA has plans that call for such things as interplanetary probes to measure the atmospheres of Venus and Mars; inosphere studies of the regions surrounding the earth and possibly other planets; studies of the origin of energetic particles such as cosmic rays and radiation belts; mapping of the solar system's magnetic field; space astronomy studies, using a telescope mounted on altitude-stabilized satellite, and, of course, space vehicles, such as SATURN, which, it would seem, are our best bet to overtake the Russians eventually in space weight carrying capability.

WHEN?

There are those who feel that this isn't quite enough, that we should be thrusting forth more boldly instead of seeming to wade slowly into space. And of course these plans of NASA are still mostly on paper and the hard, pragmatic work of translating all this into reality lies ahead.

There seems to be no question in NASA, or, really, anywhere else, that America will get a man into space, will land on the moon, will explore the planets, will soar to the utmost regions of space. The thing that needs to be resolved is *when*.

Are we putting enough effort into this, are we being as forceful and imaginative as we should, do we have the stamina, the drive and will . . . as a land of free and independent men . . . to see such long-range and difficult-attaining visions through. That is the question mark that hangs so broodingly over this squat structure on H Street. ■

My Auntie's boattail has a lot of grain in it

(A glossary of missile terminology)

WHEN YOU go to NASA-land, you may hear some mighty strange language being bruited about. If you'll thrust these words into your vocabulary, it probably will stand you in good stead:

Exosphere—the outermost fringe of the atmosphere.

Boattail—the cylindrical, tapering tail section of any missile. It helps reduce over-all aerodynamic drag of airframe.

Kinematics—a study of motions.

Parsec—a unit of measure for interstellar space. It is the equivalent of 3.26 light years.

Biosatellite—a satellite that carries an animal or plant life.

Cislunar — space between the earth and the orbit of the moon.

Dog House — the mound-like housing outside of a rocket which houses instruments.

Emissivity—the ability of a surface to effect thermal radiation.

Lox—this kind you don't eat for breakfast. It means liquid oxygen.

Gantry—name of a special crane or scaffold used in missile and vehicle launchings.

Aeropause — a portion of the upper region of the atmosphere which does not give any aerodynamic support of flight.

Astrionics—the science of adopting electronics to space flight.

Dry Weight—the weight of a rocket or missile without its fuel.

Grain—the body (i. e., mass) of a solid propellant used in a rocket.

Pick-Up—a sensing unit which "picks up" and measures such variables as temperature, pressure and velocity during flight.

Ablation — method of cooling nose cones on re-entry by flaking off outer covering.

Auntie—Anti-Missile Missile. ■

Congress Takes Up Space

An Exclusive Data Interview with Congressman Overton Brooks, head of the House Science and Astronautics Committee by Harold Helfer/DATA

Congressman Brooks

NASA should take over all space projects.

All space projects should be stamped DX — highest national priority.

NASA probably will receive more money than it asks for.

The note of urgency is still lacking in our space effort.

The need for a communication satellite has become imperative.

The Russians probably will have a man on the moon within 18 months.

It will be some five years before we can overtake the Soviets in space—and only then if we make an all-out effort.

We may have to do without new TV sets, radios, refrigerators, etc., in this effort to catch up with the Russians.

CONGRESSMAN OVERTON BROOKS (D., La.), head of the House Science & Astronautics Committee, has these thoughts and believes that eventually the National Aeronautics and Space Administration is not only going to take over all fundamental space projects because it is practical that it be done this way but also as a matter of international policy.

"Of course, if there is some matter that is peculiarly of a military nature the military should handle it," Congressman Brooks told DATA, "but all basic research and development, all the fundamental aspects of space, should be handled by NASA."

The House of Representative's No. 1 space man sees it this way:

"Let us say that we decide to build a space vehicle to go to Mars. This should be strictly a NASA matter. But suppose the military people see in this vehicle, with a few variations here and there, something that could be used by them as a space orbiting reconnaissance craft. Then the military should be allowed to pursue that, assuming NASA has no real interest in that."

The Louisiana Congressman thinks it important that NASA take over the principal aspects of space because he thinks we must have the civilian stamp, rather than the military one, on our space explorations.

"Of course, much of our space efforts are going to have a military as well as purely scientific interest," he said. "But it would be a mistake of the first order in our relations with the rest of the world if we gave our space endeavors a military rather than a scientific imprint and connotation."

The tall, rangy lawmaker went on. "It makes all the difference in the world if one of our orbiting craft is considered to be a 'military spy' or whether it is done under the aegis of science. Take the (MERCURY) Astronauts. They had to come under the NASA program. If these men made their space venture under a military banner and had to come down in some foreign country, they could be regarded as 'invading soldiers.' As it is, they will be performing for science and in the interest of all humanity."

The Congressman is disturbed about our overall space efforts though. NASA is asking for $915,000,000 for fiscal year 1961. The Chairman of the House Space Committee told DATA that they'll probably get "at least a billion dollars" before the year is over. "We're going to encourage NASA to go as all out as it can in its space efforts."

Congressman Brooks still thinks we lack the sense of urgency that is required to really get into contention with the Soviets in space. "Immediately after the shock of Sputnik, a sense of emergency perhaps did pervade this country," he said. "But now, I'm afraid, we're lulled back to our rocking chair attitude. I find, for instance, necessary contrivances in our space programs being held up sometimes because someone isn't willing to pay time-and-a-half for overtime for awhile. And a whole project can be delayed as a result."

The Louisiana solon revealed that some private concerns, such as the telephone industry, are beginning to spend millions of their own in space research efforts because our present cable and communication paraphernalia in general are becoming too inadequate for our needs. "There seems little question but that we need a satellite communication reflection up in space," he said.

Congressman Brooks thinks it will take a concerted all-out effort of the first magnitude to catch up with, much less hope to get ahead of, the Russians, but he thinks if we do make this effort we can eventually surpass the Soviets, perhaps in about five years (although he seems pretty much resigned to the fact that they're going to beat us to getting a man to the moon).

He thinks it is quite possible that the result of a truly great national space effort may result in a halt for some time in some of our public consumer production, particularly perhaps in the appliance fields. "Because of material and trained skill shortages," he says, "we may have to suffer something of a crimp in our creation of new radios, TV sets, washing machines, and so on, perhaps even automobiles. But if we have to do this, we have to. It's a matter of tightening up our luxury belt in the interest of survival." ■

DATAGRAM

AIR/SPACE DATA

HERCULES COMPLETES DRONE TESTS

This GC-130A prop-jet has completed tests with supersonic drones, the Ryan XQ-2A and Firebee XQ-2C, as advanced aerial launching system for missile target practice. ///ARDC/

NAVY F4H BEGINS CARRIER QUALS

New hi-flying all-weather McDonnell F4H began carrier ops aboard USS INDEPENDENCE in mid-Feb. This a/c carries Sparrow III and Sidewinder missiles and has longest range of any Navy fighter. ///DOD/

NOZZLE R&D INITIATED AT TORNADO

Tornado Turbines, Santa Maria, Calif. are initiating tests on variable exhaust, stainless steel nozzles. Test stand firings, running continuously for 30 hours at 5000 degrees F. showed no signs of wear. Success attributed to double vortex design. ///Tornado/

T53 GAS TURBINE ENGINE CONTRACT TO AVCO

Army awarded $2,485,000 contract for new helicopter powerplant to be used in production of advanced Bell HU-1B Iroquois. ///AVCO/

SPACE SYSTEM ANALYZER SCHEDULED FOR WRIGHT-PATTERSON

Minneapolis-Honeywell will be prime contractor for analyzer at this AF base. Analyzer will test systems and subsystems of present and future space satellites in hangar to predict effect on vehicle of motion in space. ///DOD/

BRITAIN'S SC-1 VTOL PASSES FLIGHT TESTS

This delta-wing VTOL has 5 engines: 1, in rear, provides forward thrust; 4 other lifting engines swing in pairs on an axis so that thrust center may be directed fore or aft with aft engines acting as brake on landing. ///DATA/

ARMY ACCEPTS CARIBOU FOR TRANSPORT

This YAC-1 short takeoff and landing aircraft has been accepted by Army for passenger use and cargo transport. Flies at very low speeds; has large loading door to permit rapid jettisoning of cargo in airborne operations. ///Army/

NASA AND CANADA COOPERATE ON SATELLITE STUDY

A sweep frequency topside sounder satellite will be used by joint force to study the ionosphere, especially the upper levels which, at present, are out of reach of telemeter equipment. The satellite will be launched in polar orbit in 1961. Info received will be of particular interest to Canada in respect to auroral zones because of special communications problems in arctic regions. ///NASA/

YOU, TOO, CAN OWN A HELICOPTER

"Little Zipster" — one-man 'copter, operating cost: $5. per hr.; cruising speed: 50 mph; cost: approx. $7000. ///DATA/

SMALL BIZ FIRM MAKES ION ENGINE

Beating out such giants as Rocketdyne, Aerojet-General, Avco, etc., Electro-Optical Systems of Pasadena has won the contract to built the Air Force's first ion engine for space. Electro-Optical has only 200 employes. ///DATA/

BALLOON STUDIES YIELD STRATOSPHERE DATA

Infra-red studies in series of balloon flights from Holloman AF base have gathered a wealth of stratosphere data. Three million digits of info for each 12-hour flight have been gathered in efforts to probe radiation problems and these will be reduced by data computers at U. of Denver. ///ARDC/

GROUND SUPPORT DATA

SOME MORE ANTI-TANK WEAPONS

Army has announced a new 90mm. recoilless rifle capable of destroying "heaviest tanks known." Weight: 35 lbs. Range: 500 yd. Virtually recoilless because of gas exhaust from nozzle at rear of weapon. It is designed to be operated by 2-man teams but, in emergencies, one man might handle it alone.

SS-12, a larger version of the French-built SS-10 and SS-11, is being developed by Nord (Fr.). It is to have much greater range, not to be wire-guided, and may carry nuclear warhead. Low in cost and highly accurate. ///Army/

M14 RIFLE ISSUED TO AIRBORNE TROOPS

New rifle, firing ammunition interchangeably with weapons of other NATO nations, will replace M-1 rifle, M-2 carbine, BAR, and M-3A1 submachinegun. Capable of automatic and semi-automatic fire, it provides additional fire-power because of 20-round magazine. Weighs 10 lbs. fully loaded. ///DOD/

IMPROVED DISTILLATION UNIT DEVELOPED BY ARMY

All-aluminum sea water distillation unit will be supplied to troops to replace cupro-nickel units now in use. New equipment will be lighter, have greater capacity, better fuel economy; will probably be trailer-mounted. ///Army/

LOGISTICS/MATERIALS DATA

ARMY OPENS SUPER-EFFICIENT SUPPLY CENTER

Based at St. Louis, Mo., a new automatic data processing center speeds up tremendously the work of the US Army's Transportation and Materiel Command. Shipping cycle, which formerly took 15 days, will be completed in 72 hours. It can pin-point any part in stock, or recommend a substitute, and transmit shipping orders to right depot. ///Army/

SHOCK-RESISTANT CONTAINER BY MONOGRAM

Monogram Precision Industries has come out with containers suitable for transportation of electronic and missile gear. The boxes are metal-faced sandwich structures with a high strength-weight ratio in addition to a flexible corner feature. ///Monogram/

PELLETS RUN HOT AND COLD

Pellets of a semi-conductor material warm a suit being developed by Navy when a current is passed through thermoelectric conditioner. Suit is cooled when a current is reversed. ///Navy/

RELIEF FROM SMOG?

Royco Instruments, Mountain View, Calif., has designed an atmospheric particle counting device for continuous monitoring of outdoor or indoor air or atmospheres. ///DATA/

SOVIETS DEVELOP GLASS FOR INDUSTRIAL & VODKA USE

Soviet scientists have developed a material called "sital" which is described as a microcrystalline glass and is said to be harded than steel but lighter than aluminum. This new material is expected to be used for machine parts, pipes, and containers for liquid chemicals. ///DATA/

MISSILE DATA

ATLAS NOSE MAY SOON BE RUNNING

Development is underway by General Electric of a controllable nose cone for the Atlas ICBM to give it the capability of changing its flight path from a straight ballistic trajectory and complicate the task of anti-ICBM defenses. ///Aviation Week/

BOMARC-B'S TO FLY FROM SURFACE

Hardening of BOMARC interceptor missile bases seems to be out. Pentagon feels putting BOMARC-B launchers underground would only delay making them operational. ///DATA/

AF ANNOUNCES 4 ATLAS BASES

Underground complexes will be built at Plattsburgh, N. Y.; Altus, Okla.; Walker, Roswell, N. M.; and Dyess, Abilene, Texas. This accounts for 10 out of 13 proposed ATLAS sites. ///AF Info/

MOBILE MISSLE TOWER

A 15-story high, portable missile service tower, probably the heaviest and tallest structure mounted on pneumatic tires, has been developed by Army. ///AFPS/

AF GIVES GO-AHEAD ON SKY BOLT

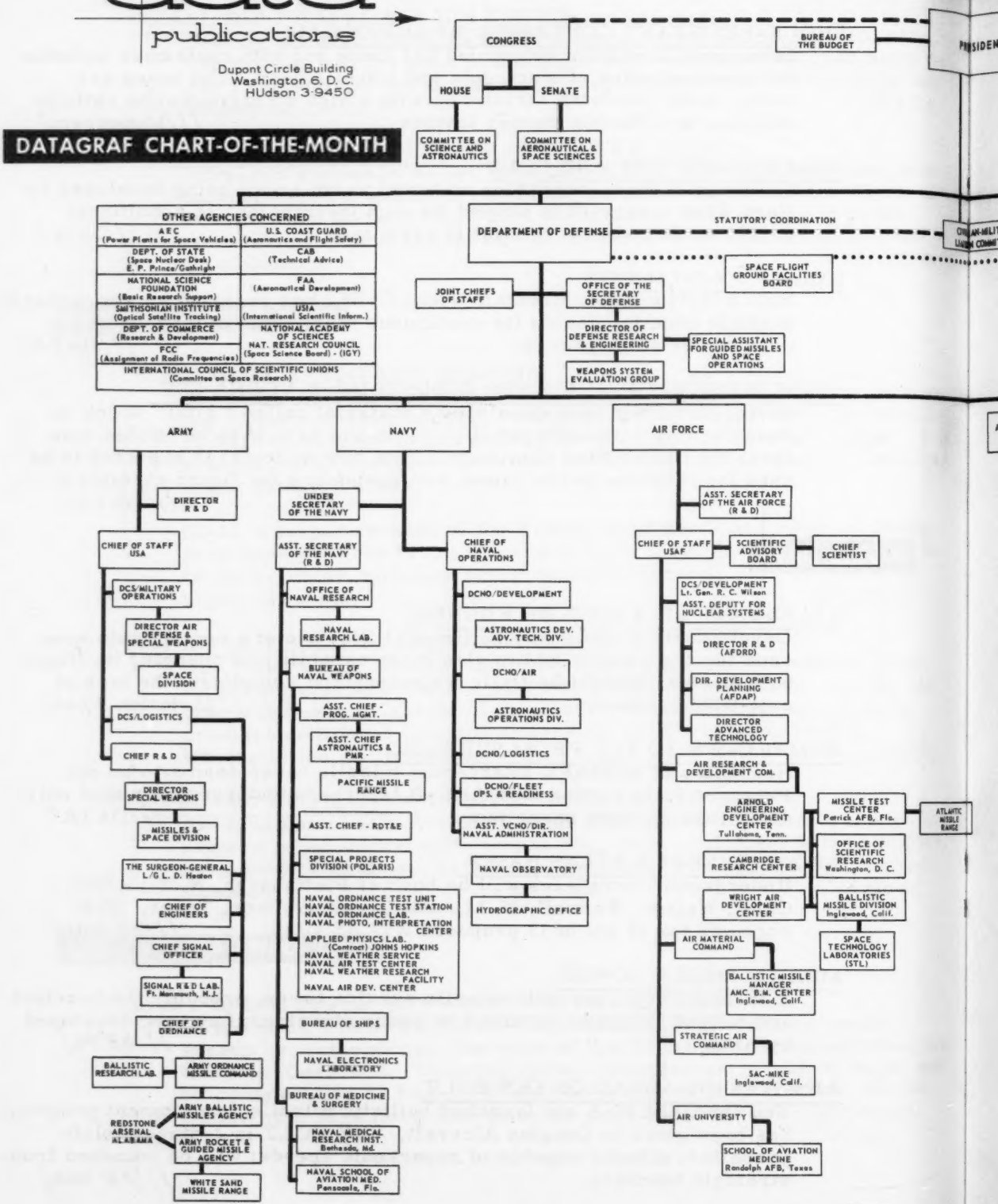
Nod for GAM 87-A air launched ballistic missile development program has been given to Douglas Aircraft. SKY BOLT is 2-stage, solid-propellant missile capable of supersonic speeds; will be launched from strategic bombers. ///AF Info/

data publications
Dupont Circle Building
Washington 6, D. C.
HUdson 3-9450

THE U.S. NATIONAL

Shown in a Comprehensive

DATAGRAF CHART-OF-THE-MONTH


CONGRESS
HOUSE
SENATE
COMMITTEE ON SCIENCE AND ASTRONAUTICS
COMMITTEE ON AERONAUTICAL & SPACE SCIENCES
BUREAU OF THE BUDGET
PRESIDEN
OTHER AGENCIES CONCERNED
AEC (Power Plants for Space Vehicles)
U.S. COAST GUARD (Aeronautics and Flight Safety)
DEPT. OF STATE (Space Nuclear Desk) E. P. Prince/Gathright
CAB (Technical Advice)
NATIONAL SCIENCE FOUNDATION (Basic Research Support)
FAA (Aeronautical Development)
SMITHSONIAN INSTITUTE (Optical Satellite Tracking)
USIA (International Scientific Inform.)
DEPT. OF COMMERCE (Research & Development)
NATIONAL ACADEMY OF SCIENCES NAT. RESEARCH COUNCIL (Space Science Board) - (IGY)
FCC (Assignment of Radio Frequencies)
INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS (Committee on Space Research)
DEPARTMENT OF DEFENSE
STATUTORY COORDINATION
SPACE FLIGHT GROUND FACILITIES BOARD
JOINT CHIEFS OF STAFF
OFFICE OF THE SECRETARY OF DEFENSE
DIRECTOR OF DEFENSE RESEARCH & ENGINEERING
SPECIAL ASSISTANT FOR GUIDED MISSILES AND SPACE OPERATIONS
WEAPONS SYSTEM EVALUATION GROUP
ARMY
DIRECTOR R & D
CHIEF OF STAFF USA
DCS/MILITARY OPERATIONS
DIRECTOR AIR DEFENSE & SPECIAL WEAPONS
SPACE DIVISION
DCS/LOGISTICS
CHIEF R & D
DIRECTOR SPECIAL WEAPONS
MISSILES & SPACE DIVISION
THE SURGEON-GENERAL L/G L. D. Heaton
CHIEF OF ENGINEERS
CHIEF SIGNAL OFFICER
SIGNAL R & D LAB. Ft. Monmouth, N.J.
CHIEF OF ORDNANCE
BALLISTIC RESEARCH LAB.
ARMY ORDNANCE MISSILE COMMAND
ARMY BALLISTIC MISSILES AGENCY
REDSTONE ARSENAL ALABAMA
ARMY ROCKET & GUIDED MISSILE AGENCY
WHITE SAND MISSILE RANGE
NAVY
UNDER SECRETARY OF THE NAVY
ASST. SECRETARY OF THE NAVY (R & D)
OFFICE OF NAVAL RESEARCH
NAVAL RESEARCH LAB.
BUREAU OF NAVAL WEAPONS
ASST. CHIEF - PROG. MGMT.
ASST. CHIEF ASTRONAUTICS & PMR
PACIFIC MISSILE RANGE
ASST. CHIEF - RDT&E
SPECIAL PROJECTS DIVISION (POLARIS)
NAVAL ORDNANCE TEST UNIT
NAVAL ORDNANCE TEST STATION
NAVAL ORDNANCE LAB.
NAVAL PHOTO. INTERPRETATION CENTER
APPLIED PHYSICS LAB. (Contract) JOHNS HOPKINS
NAVAL WEATHER SERVICE
NAVAL AIR TEST CENTER
NAVAL WEATHER RESEARCH FACILITY
NAVAL AIR DEV. CENTER
BUREAU OF SHIPS
NAVAL ELECTRONICS LABORATORY
BUREAU OF MEDICINE & SURGERY
NAVAL MEDICAL RESEARCH INST. Bethesda, Md.
NAVAL SCHOOL OF AVIATION MED. Pensacola, Fla.
CHIEF OF NAVAL OPERATIONS
DCNO/DEVELOPMENT
ASTRONAUTICS DEV. ADV. TECH. DIV.
DCNO/AIR
ASTRONAUTICS OPERATIONS DIV.
DCNO/LOGISTICS
DCNO/FLEET OPS. & READINESS
ASST. VCNO/DIR. NAVAL ADMINISTRATION
NAVAL OBSERVATORY
HYDROGRAPHIC OFFICE
AIR FORCE
ASST. SECRETARY OF THE AIR FORCE (R & D)
CHIEF OF STAFF USAF
SCIENTIFIC ADVISORY BOARD
CHIEF SCIENTIST
DCS/DEVELOPMENT Lt. Gen. R. C. Wilson
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DIRECTOR R & D (AFDRD)
DIR. DEVELOPMENT PLANNING (AFDAP)
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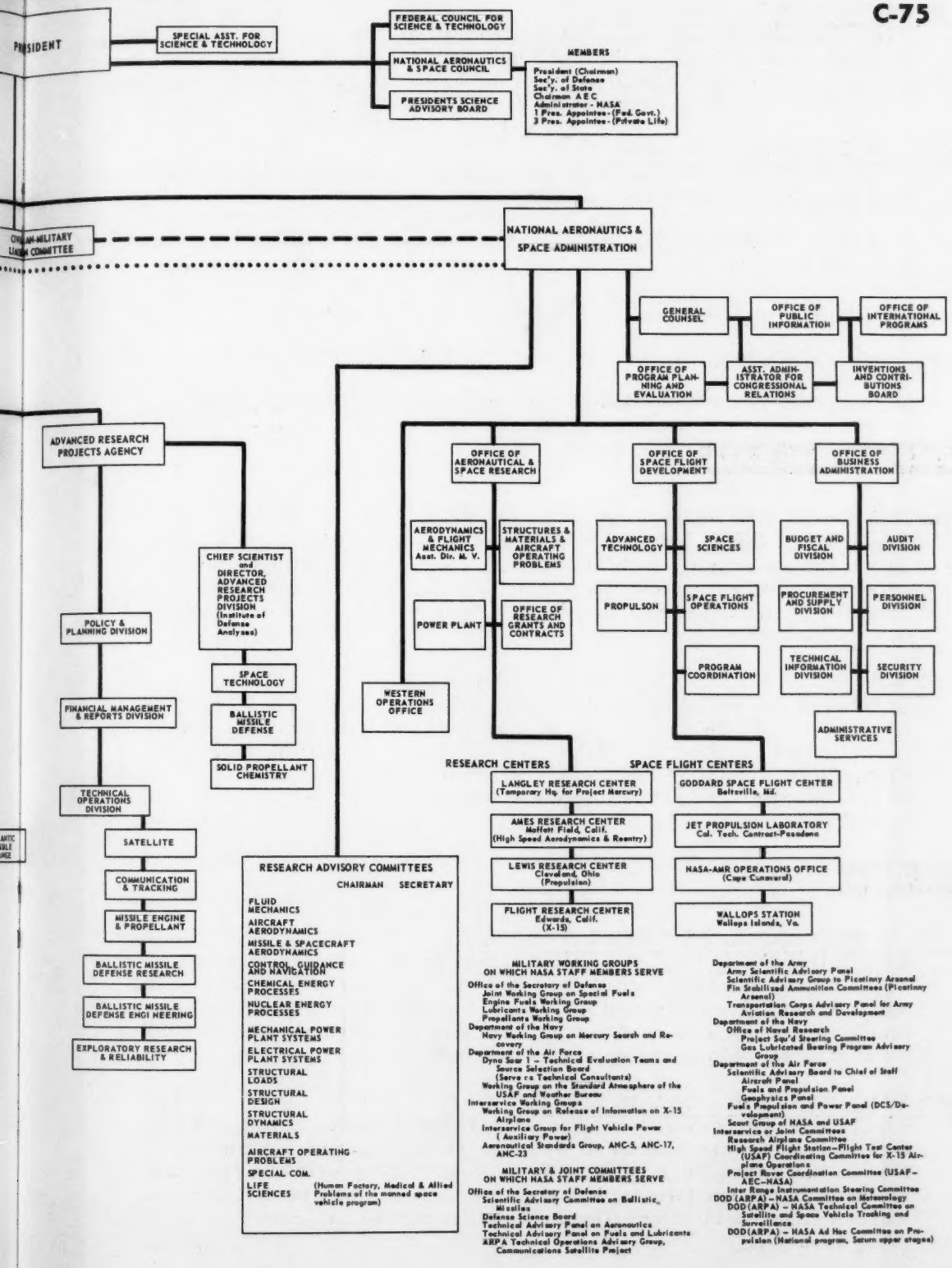
AIR RESEARCH & DEVELOPMENT COM.
ARNOLD ENGINEERING DEVELOPMENT CENTER Tullahoma, Tenn.
MISSILE TEST CENTER Patrick AFB, Fla.
ATLANTIC MISSILE RANGE
CAMBRIDGE RESEARCH CENTER
OFFICE OF SCIENTIFIC RESEARCH Washington, D. C.
WRIGHT AIR DEVELOPMENT CENTER
BALLISTIC MISSILE DIVISION Inglewood, Calif.
SPACE TECHNOLOGY LABORATORIES (STL)
AIR MATERIAL COMMAND
BALLISTIC MISSILE MANAGER AMC. B.M. CENTER Inglewood, Calif.
STRATEGIC AIR COMMAND
SAC-MIKE Inglewood, Calif.
AIR UNIVERSITY
SCHOOL OF AVIATION MEDICINE Randolph AFB, Texas

TIONAL SPACE PROGRAM

...ensive Organization Chart

C-75


PRESIDENT
SPECIAL ASST. FOR SCIENCE & TECHNOLOGY
FEDERAL COUNCIL FOR SCIENCE & TECHNOLOGY
NATIONAL AERONAUTICS & SPACE COUNCIL
PRESIDENTS SCIENCE ADVISORY BOARD
MEMBERS
President (Chairman)
Sec'y. of Defense
Sec'y. of State
Chairman AEC
Administrator - NASA
1 Pres. Appointee - (Fed. Govt.)
3 Pres. Appointee - (Private Life)
CIVILIAN-MILITARY LIAISON COMMITTEE
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
GENERAL COUNSEL
OFFICE OF PUBLIC INFORMATION
OFFICE OF INTERNATIONAL PROGRAMS
OFFICE OF PROGRAM PLANNING AND EVALUATION
ASST. ADMINISTRATOR FOR CONGRESSIONAL RELATIONS
INVENTIONS AND CONTRIBUTIONS BOARD
ADVANCED RESEARCH PROJECTS AGENCY
CHIEF SCIENTIST and DIRECTOR, ADVANCED RESEARCH PROJECTS DIVISION (Institute of Defense Analyses)
POLICY & PLANNING DIVISION
SPACE TECHNOLOGY
FINANCIAL MANAGEMENT & REPORTS DIVISION
BALLISTIC MISSILE DEFENSE
SOLID PROPELLANT CHEMISTRY
TECHNICAL OPERATIONS DIVISION
SATELLITE
COMMUNICATION & TRACKING
MISSILE ENGINE & PROPELLANT
BALLISTIC MISSILE DEFENSE RESEARCH
BALLISTIC MISSILE DEFENSE ENGINEERING
EXPLORATORY RESEARCH & RELIABILITY
OFFICE OF AERONAUTICAL & SPACE RESEARCH
AERODYNAMICS & FLIGHT MECHANICS Asst. Dir. M. V.
STRUCTURES & MATERIALS & AIRCRAFT OPERATING PROBLEMS
POWER PLANT
OFFICE OF RESEARCH GRANTS AND CONTRACTS
WESTERN OPERATIONS OFFICE
OFFICE OF SPACE FLIGHT DEVELOPMENT
ADVANCED TECHNOLOGY
SPACE SCIENCES
PROPULSON
SPACE FLIGHT OPERATIONS
PROGRAM COORDINATION
OFFICE OF BUSINESS ADMINISTRATION
BUDGET AND FISCAL DIVISION
AUDIT DIVISION
PROCUREMENT AND SUPPLY DIVISION
PERSONNEL DIVISION
TECHNICAL INFORMATION DIVISION
SECURITY DIVISION
ADMINISTRATIVE SERVICES
RESEARCH CENTERS
LANGLEY RESEARCH CENTER (Temporary Hq. for Project Mercury)
AMES RESEARCH CENTER Moffett Field, Calif. (High Speed Aerodynamics & Reentry)
LEWIS RESEARCH CENTER Cleveland, Ohio (Propulsion)
FLIGHT RESEARCH CENTER Edwards, Calif. (X-15)
SPACE FLIGHT CENTERS
GODDARD SPACE FLIGHT CENTER Beltsville, Md.
JET PROPULSION LABORATORY Cal. Tech. Contract-Pasadena
NASA-AMR OPERATIONS OFFICE (Cape Canaveral)
WALLOPS STATION Wallops Islands, Va.
RESEARCH ADVISORY COMMITTEES
CHAIRMAN SECRETARY
FLUID MECHANICS
AIRCRAFT AERODYNAMICS
MISSILE & SPACECRAFT AERODYNAMICS
CONTROL, GUIDANCE AND NAVIGATION
CHEMICAL ENERGY PROCESSES
NUCLEAR ENERGY PROCESSES
MECHANICAL POWER PLANT SYSTEMS
ELECTRICAL POWER PLANT SYSTEMS
STRUCTURAL LOADS
STRUCTURAL DESIGN
STRUCTURAL DYNAMICS
MATERIALS
AIRCRAFT OPERATING PROBLEMS
SPECIAL COM.
LIFE SCIENCES (Human Factory, Medical & Allied Problems of the manned space vehicle program)
MILITARY WORKING GROUPS ON WHICH NASA STAFF MEMBERS SERVE
Office of the Secretary of Defense
Joint Working Group on Special Fuels
Engine Fuels Working Group
Lubricants Working Group
Propellants Working Group
Department of the Navy
Navy Working Group on Mercury Search and Recovery
Department of the Air Force
Dyna Soar I - Technical Evaluation Teams and Source Selection Board (Serve as Technical Consultants)
Working Group on the Standard Atmosphere of the USAF and Weather Bureau
Interservice Working Groups
Working Group on Release of Information on X-15 Airplane
Interservice Group for Flight Vehicle Power (Auxiliary Power)
Aeronautical Standards Group, ANC-5, ANC-17, ANC-23
MILITARY & JOINT COMMITTEES ON WHICH NASA STAFF MEMBERS SERVE
Office of the Secretary of Defense
Scientific Advisory Committee on Ballistic Missiles
Defense Science Board
Technical Advisory Panel on Aeronautics
Technical Advisory Panel on Fuels and Lubricants
ARPA Technical Operations Advisory Group, Communications Satellite Project
Department of the Army
Army Scientific Advisory Panel
Scientific Advisory Group to Picatinny Arsenal
Fin Stabilized Ammunition Committees (Picatinny Arsenal)
Transportation Corps Advisory Panel for Army Aviation Research and Development
Department of the Navy
Office of Naval Research
Project Squid Steering Committee
Gas Lubricated Bearing Program Advisory Group
Department of the Air Force
Scientific Advisory Board to Chief of Staff
Aircraft Panel
Fuels and Propulsion Panel
Geophysics Panel
Fuels Propulsion and Power Panel (DCS/Development)
Scout Group of NASA and USAF
Interservice or Joint Committees
Research Airplane Committee
High Speed Flight Station - Flight Test Center (USAF) Coordinating Committee for X-15 Airplane Operations
Project Rover Coordination Committee (USAF-AEC-NASA)
Inter Range Instrumentation Steering Committee
DOD (ARPA) - NASA Committee on Meteorology
DOD (ARPA) - NASA Technical Committee on Satellite and Space Vehicle Tracking and Surveillance
DOD (ARPA) - NASA Ad Hoc Committee on Propulsion (National program, Saturn upper stages)

PERSHING TO GO ON SCHEDULE

Firing of this surface-to-surface bird will go "on schedule" according to officials of AOMC but date has not been specified. This solid-propellant, selective-range, two-stage ballistic missile is built to replace REDSTONE but will have greater mobility and flexibility. ///Army/

MISSILE CONTRACT AWARDS

- Kaiser-Raymond-Macco-Puget Sound:$28,899,000, by Army, for construction of TITAN facilities at Mountain Home, Idaho.
- RCA:$474,831,000, by AF, for detection system for BMEWS, thereby bringing to more than $700,000,000, the contract total for BMEWS.
- Raytheon: $4,499,634 for HAWK missile test equipment.
- Convair: $25,500,000, for advanced TERRIER guided missile.
- Martin: $82,599,690, by Army, for continued R&D on PERSHING.

SUBMARINE WARFARE DATA

AMPHIB CHOPPER PERFORMS WELL

The HSS-2, Navy's twin-turbine Sikorsky amphibious 'copter being developed as a highly mobile anti-sub weapon, is making excellent progress. Recent accomplishments include hovering for more than 3 hours, flying $10\frac{1}{2}$ hours in a day, limping back to base on one engine for test purpose. ///AFPS/

REYNOLDS PRODUCES RESEARCH SUBMARINE

In concept and purpose similar to the Piccard TRIESTE , Reynolds Aluminum's ALUMINAUT will be roomier and have cruising radius of 100 miles as opposed to TRIESTE's 1/4 mile. It will be able to dive to 15,000 ft. TRIESTE's depth record set in the Marianas Trench was originally set 2,000 ft. above actual depth and should have read 35,800 ft. ///Navy/

DEADLINE DATA

AEC TO USE LIQUID BED REACTOR

AEC will use this new, simplified liquid fluidized bed reactor, a system which will eliminate control rods and cut fuel fabrication costs. It will use pea-size pellets of fissionable material immersed in liquid inside a cylinder and reaction will consist of action similar to boiling a pot of peas. More easily controlled than previous systems.///AEC/

BANYAN TREE II BLOOMS IN MARCH

Field maneuver in which ground and air units of US, Brazil, Chile, Colombia, Panama, and Peru will take part, is scheduled for March, 1960 in the Canal Zone. Both STRAC and TAC forces will take part. Purpose is to simulate rapid reinforcement of Caribbean Command Forces engaged in combatting an aggressor who has executed a surprise invasion. ///DOD/

RE-ARMAMENT PLANS FOR WEST GERMANY

— F-104 Starfighters, to be built in West Germany plants, are to number 564 instead of 200 called for originally. Ninety-six additional will be purchased from US manufacturer.

— Nuclear sub, built with US aid to be launched within 3 years.

— US surface-to-surface missile, the MACE, including launcher, to be purchased by WG.

— WG will cooperate in development of BLUEWATER, Britain's ground-to-ground artillery rocket.

— WG and Britain will cooperate in development of tank which will probably use British 105mm gun now in use on British medium tanks.

///DATA/

ROTC PROGRAM CHANGED

To increase intellectual achievement among future officers, ROTC program has been changed to permit advanced cadets to take some military instruction in university-taught subjects such as science, psychology, communications, and political institutions. (Also, there is increasing unrest on college campuses around the country concerning antiquated equipment with which ROTC trains. It looks like a major over-haul is due for the entire program.) ///DATA/

PRINTED CIRCUIT AN INNOVATION IN MOTORS

Photocircuits Corp. has produced electric motor using flat printed circuit instead of conventional wire-wound armature. Light weight, low armature inertia and inductance — for servo and instrument use.

///Photocircuits/

VAMPIRES: CHECK THIS NEW GIMMICK

Experiments with frozen human blood and frozen blood components may solve the blood supply problem in case of mass casualties which may be expected during any future war or even during local disasters.

///DATA/

FAA REQUIRES PILOTS WEAR OXYGEN MASKS

Flight crews of turbine powered air carrier aircraft will be required to wear oxygen masks under new ruling. One pilot at controls must use mask at all times when flying above 30,000 ft. and all crew members shall wear quick-donning masks. ///FAA/

FLASH GORDON IS FOR REAL

Columbia Broadcasting System labs have developed a high-fidelity televiewer that is supposed to ride a rocket and flash pictures of the planets back to earth. ///CBS/

HYMIE? WHY AREN'T YOU AT THE STORE?

El Al Israel Airlines has inaugurated a plane-to-shore phone service for passengers on international flights. The toll is the usual trans-oceanic rate. ///El Al Israel/

GEORGE WASHINGTON TO BE BRITAIN-BASED

Adm. H. P. Smith has predicted that the GEORGE WASHINGTON, US first missile-carrying nuclear powered sub will be based in London when it becomes operational late in 1960. ///DATA/

IS THERE A COMPUTER IN THE HOUSE?

Soviet's have developed an electronic diagnosing machine: on the control board are a number of symptoms designated by numbered buttons. You push the pertinent buttons, the machine shuffles your symptoms and concludes that you have one of 96 possible diseases. An ideal gift for that special hypochondriac on your list. ///DATA/

SUPER-SPEED MOVIE CAMERA

Lehigh University has patented a high speed camera in which a magnetic fluid clutch is used to obtain film speeds of 35 ft. per sec. in less than 1/10th of a sec. ///Signal/

TALKING SCALES TALK SALES

Dept. of Commerce is intrigued by some new scales that deliver a sales talk as well as weight cards. Ten six-second advertising blurbs are prerecorded on each machine. ///Dept. of Commerce/

NBS REVEALS TUNGSTEN PLATING PROCESS

National Bureau of Standards has developed a vapor deposition process whereby high-purity tungsten can be easily plated on metal surfaces by reducing gaseous tungsten hexafluoride with hydrogen. Because of the rapidity of deposition, the process lends itself to the continuous production of tungsten-coated strips or wires. ///NBS/

CONTRACTS AWARDED ON M-60 TANKS

Chrysler snagged $2,380,189 license for engineering services and Continental Motors, a $9,065,000 contract for 720 M-60 tank engines and power pack assembly with spare parts. ///DOD/

HOT WIRE DATA

Satellite launching site being constructed in northwest China; Soviet will probably provide boosters enabling China to cut lead time . . . Boeing scheduling major non-military diversifications because of uncertainty of military weapons . . . 6,000 men to hear Army draft call in April . . . The only Army battalion combat team stationed in Iceland will be returned to US and inactivated soon . . . Contracts for Missile A to be let soon for development of test models . . SCOUT to be launched in June . . . Soviet atomic subs are under development and it is expected that at least one will be announced in the beginning of 1961 . . . Rumor has it that Italian Somaliland has offered an equatorial launching site to NASA, near Kisimaio . . Piper Aircraft has received $945,000 contract for purchase and initial maintenance of 20 Aztec twin-engine planes to be used by Navy as lightweight utility planes . . . Video picture freezer has been developed which instantly stops TV picture and holds fixed image on screen for as long as 10 min. . . . Temco Aircraft awarded $25 million contract for development on CORVUS, Navy missile.

ALBERT F. SIEPERT
Business Administration

NEWELL D. SANDERS
Advanced Technology

DEMARCUS D. WYATT
Space Flight

MORTON J. STOLLER
Space Science

WALTER T. BONNEY
Public Information

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

1512 H Street, N.W.
Washington 25, D. C.

March, 1960

TELEPHONE DIRECTORY

• **NOTICE—Switchboard exchange for four-digit extensions as listed is DUdley 2 followed by four digit extension. Switchboard exchange for five-digit extensions preceded by 181 is REpublic 7-7500.**

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Legislative Assistant	Howard Dale Grubb	7606
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	William J. Underwood (Secy)	6357
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RICHARD V. RHODE
Air Materials

ELLIOTT MITCHELL
SCOUT Rocket

MILTON W. ROSEN
CENTAUR Rocket

EDGAR M. CORTRI
Advanced Technol

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	High Energy Propellant Engines—Melvyn Savage	6602
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	Scout Vehicle—Elliot Mitchell	6314
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	Planetary Science Programs, Chief—Dr. John F. Clark	7810
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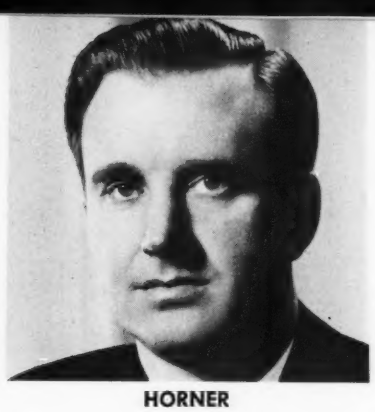
Astronomy & Astorphysics, Chief—Dr. Gerhard F. Schilling		6317
Office of Program Coordination		
	Assistant Director—Dr. John P. Hagen	6430

NASA PROFILES

GLENNAN



HORNER

T. KEITH GLENNAN, Administrator

T. (for Tom) Keith Glennan probably will be calling you by your first name before your talk with him is over. Is on a first-name basis with most of the people around him. Habit he picked up from the informality of Hollywood, when he was studio manager of Paramount Pictures and Samuel Goldwyn Studios. Probably knows more movie stars personally than anybody in Washington. Too busy since joining NASA though to see any of them when they come through the capital.

Glennan is a nifty dresser, likes nifty dressed people around him. Enjoys golf and tennis, but hasn't been able to indulge in either since coming to NASA.

Keith Glennan would qualify as Horatio Alger hero. Born in small town of Enderlin, North Dakota, (1905), son of a train dispatcher, made it to Yale, married the former Ruth Haslup Adams, daughter of late Dr. Thomas Sewell Adams, eminent Yale professor and tax authority, for whom he served as chauffeur while a student. The Glennans have four children, Tom Jr., who has been pursuing graduate studies at M. I. T.; Catherine, who's been attending Swarthmore; Polly, a recent high school graduate; and Sally, whose going to high school.

Glennan, who has an electrical engineering degree, served as director of U. S. Navy's Underwater Sound Laboratories, also as an executive of Ansco, before assuming Presidency of Case Institute of Technology, Cleveland, during his 11-year administration brought the school up to rank with nation's top engineering institutions.

Served as member of Atomic Energy Commission while president of Case, also on board of National Science Foundation and Institute for Defense Analysis. Is civic minded, served as chairman of Metropolitan Service Commission of Cleveland. Something of a joiner, is member of Sigma XI, Tau Beta Phi and Chi Phi. In world of business, has been on boards of Cleveland Electric Illuminating Co., Clevite Corp., Standard Oil (Ohio) and Harris-Intertype Corp.

Likes to piddle around in kitchen, can make quite a few fancy desserts but is in a class all his own when it comes to producing onion soup.

He insists on identification as "president on leave of Case Institute of Technology," which may not only be a matter of sentiment but a tipoff that he intends to leave NASA soon to return to his college presidency which is what he really likes best of all.

RICHARD E. HORNER, Associate Administrator

That smoke you see rising on Peary Street in Arlington is just Dick Horner indulging in his favorite past time, backyard steak grilling. He's also quite a skier, likes to take off for Quebec or Sun Valley whenever the skiing is good, but hasn't been able to get away very much since joining hustle-bustle NASA last June.

Has a youthful Joe College look about him, probably would have made an excellent Senator Jack Kennedy-type politician, with whom his NASA associates sometimes compare him, and he may reach the top echelon of the Government ladder anyway. He's elected to succeed Glennan as head of NASA when Glennan bows out.

Horner's a small town boy (Wrenshall, Minn.) who married a small town girl Jean Margaret Hodgson (Waseca, Minn.) and they now have two children Richard James and Judith Rae. When he manages to wangle a little free time, he likes to take his teen-age boy to ball games.

At 43, Dick Horner, who earned aeronautical engineering degree at University of Minnesota and a master's degree at Princeton, has about as bright a future as almost anyone you could mention in Washington. Has an excellent war record, was World War II pilot, served for awhile as civilian engineer at Edward Air Force Base flight test center, became Deputy for Requirements to the Assistant Secretary of the Air Force for R. & D., holding that position until his appointment as Acting Assistant Secretary of Air Force. His NASA operations include responsibility for space agency's laboratories, research centers, rocket testing and launching facilities and world network of tracking stations. Definitely a man to watch on Washington scene.

HUGH LATIMER DRYDEN, Deputy Administrator

Second in command at NASA, Hugh Latimer Dryden looks sort of like a preacher. And, as a matter of fact, is. As a college student, became a licensed Methodist minister and would preach in small churches on Sundays. To this day, will still occupy the pulpit on occasions, about twice a year, generally at the Calvert Church in Washington.

DRYDEN

BRACKETT

STEWART

Used to like to tour about the country in his auto, but NASA business now keeps him hopping about the country in plane. Dr. Dryden was born in Pocomoke City, Md. (1898), attended Johns Hopkins University, became head of National Bureau of Standards' aerodynamics section, later was Associate Director of Bureau. Performed important research on plane building materials and structures, but his main field of interest has been in air turbulence, made some of the earliest studies in this nation of airfoil characteristics at the speed of sound. He was awarded Presidential Certificate for his work in development of BAT, first American guided missile successfully used in combat.

Likes to relax by reading mystery stories . . . is an avid Perry Mason fan . . . and also likes to watch TV news programs, particularly programs like Meet The Press. Has three children, Dr. Hugh Dryden, Jr., a chemist with a private concern, a daughter who was a chemist and is married to a Navy scientist, Dr. Van Tuly, and another daughter, Nancy, who is attending American University in Washington.

Dr. Dryden has a touch of diabetes but you'd never guess it. He's not only one of the first but still one of the most energetic of the nation's spaceminded people.

ERNEST W. BRACKETT

Director Of Procurement And Contracting

One way to get in good graces of Ernest W. Brackett, NASA's top procurement man, is to get up a curling game. That's a kind of shuffleboard contest played on ice and Mr. Brackett has been chaffing somewhat at the bit since coming to curling-less Washington. Maintains a trim figure though by going in for tennis whenever he can.

Is by no means desk-bound procurement head. Travels quite a bit to personally take a hand in hammering out important contracts.

Is a habitual pipe smoker and black coffee drinker. Obviously likes his job, was a contract specialist and consultant to procurement director, Air Force Materiel Command, also was chief of contracts branch for Air Force.

Has a reputation for "laying the facts on the line," doesn't like to mince words. Is a hard guy for lawyers to bamboozle, practiced law for awhile himself in Utica, N. Y. Is an upper state New Yorker (born in town of Mohawk), attended Cornell. Is a colonel in the U. S. Air Force Reserve.

Married to the former Beatrice Paul and they have one daughter, Mrs. Jaclin Farrell, living in Cleveland, Ohio.

HOMER JOSEPH STEWART

Director Of Program Planning And Evaluation

He sports a pair of sideburns that Elvis Presley might regard with some envy. Is a sailing devotee. When domiciled in California always has nice boat of own, likes to enter sailing races, usually does well. If he decides to go back to his job as professor of aeronautics at California Institute of Technology and chief of liquid propulsion systems division at school laboratory, the opportunity to go sailing may have just a little to do with it. Always has his eyes on some nice boat or other.

Is practically a chain smoker. Has a fancy red lighter, but sometimes bypasses it to light one cigaret from another.

As director of program planning and evaluation, is probably as much on the spot as anyone in NASA, seems to take things pretty much in stride though. Has a knack of remaining unflustered.

Has aeronautical engineering degree from University of Minnesota, has served on CalTech faculty continuously from 1936 until appointment to NASA in October 1958. In 1939, became actively interested in the early pioneering rocket research of a few CalTech engineers and scientists in foothill area of San Gabriel Mountains, the group that formed nucleus of what became Jet Propulsion Laboratory, operated by CalTech under NASA contract.

Is sometimes refered to as the Cecil B. DeMilles of rockets. Participated in many pioneering rocket projects, WAC CORPORAL, CORPORAL, BUMPER, SARGENT, JUPITER C. Has been consultant to Aerojet, played important part in developing and launching of first American satellite, EXPLORER I. Is married to former Frieda Klaasen, has three children Robert 13, Katherine 11, Barbara, 8, making home now in Summer, Md., but maintains permanent resident in Altadena, Calif.

Likes to slip down into Mexico whenever he can. Has a weakness for Mexican food.

OSTRANDER

SILVERSTEIN

ABBOTT

MAJ. GEN. DON R. OSTRANDER

Director of Launch Vehicle Programs

The general is a rare steak, scotch man. Likes to prepare his own steak in kitchen when he has time.

Is small built fellow and prefers cars along same line. Usually has one of those small foreign cars to drive around in.

Married to former Frances Ann Dunn of El Paso, makes home now in Alexandria, Va., has three children, Mary Frances, 10, Don, 9, Sally, 7.

Is something of a golfer, likes boating too, also nonfiction literature, but his real hobby is his children. A little too busy for this at the moment, but used to like to go biking with the children and had his own bicycle. Is a fine leave-raker around the house.

Practically never misses attending Sunday service at Westminster Presbyterian Church in Alexandria.

A 1937 graduate of West Point, has had a part in direction of a number of Air Force missile programs for past 15 years. During World War II served as ordnance and armament officer with Eighth Air Force Interceptor Command in England, helped modify the P-38 plane to accommodate Norden bombsight. A native of Stockbridge, Mich., studied engineering at Western State College, Mich., before going to West Point. Only 45 now, will be in charge of booster development and rocket launching operations of history-making SATURN, the missile designed to probe the truly outer regions of space.

ABE SILVERSTEIN

Director Of Space Flight Development

Abe Silverstein has a reputation of being maybe the hardest worker of all hard-working NASA people. Is so busy he's practically hobbyless, unless you count relaxing with children once in awhile and taking them to the zoo or maybe the corner drugstore for soda. Lately has got interested in scouting, for the usual reason, his boys are going in for it. When he gets the chance, likes to read books dealing with history.

A native of Terre Haute, Ind., is the pioneer member among high hierarchy of NASA if you include predecessor NACA, joining NACA way back in 1929. Something of a prodigy, he soon helped design the Fullscale Wind Tunnel at the Langley Aeronautical Laboratory. Later was placed in charge of this facility, directed research which increased high-speed performance of most of World War II combat aircraft, a major factor in gaining U. S. air superiority.

Went on to become Associate Director of Lewis Laboratory, served on such committees, to show his variety of interest, as *aerodynamics, guided missiles, internal flow, aircraft power plants, space technology.* Was made chairman of the Ad Hoc Working Group On Rockets by Defense Department.

Is a member of Tau Beta Pi and a Fellow of the Institute of Aeronautical Sciences. Lives in Chevy Chase, Md., with his wife Marion and three children, Joseph, Judith and David.

IRA H. ABBOTT

Director Of Advanced Research Program

There's a Hi Fi set in Chevy Chase, Md., that's really a TV set. That'd be the home of Ira Abbott. He's always fooling around like that at the house, quite a handyman. Always sanding some piece of furniture, repainting or something. One day he transformed his TV cabinet into Hi Fi apparatus.

He's quite a fellow with the griddle too. can turn out a mean steak or hamburger. Strictly backyard variety though. Wouldn't be caught dead in a culinary pose in the kitchen.

Likes to go fishing whenever he can too. Is a bug about reading history, but, oddly enough, can't stand Westerns on TV, prefers the up-to-date plays, like Playhouse 90.

Doesn't mind being called a Big Wind. Big Winds fascinate him . . . was chairman of the Wind Tunnel panel for NATO a few years back.

He's an inveterate pipe smoker, has a marked New England twang, derived from his New Hampshire and Massachusetts boyhood days. Born 54 years ago at Wolfeboro, N. H., attended M. I. T., served with NASA's predecessor NACA for many years. Is now a member of NASA's Civilian-Military Liaison Committee.

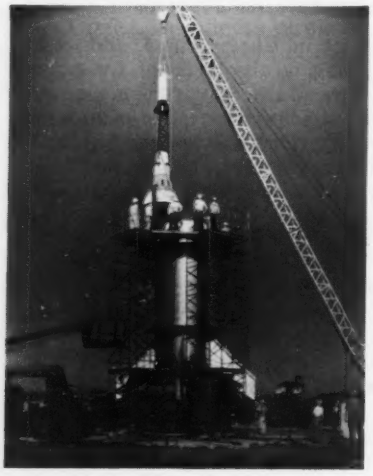
Has a son, named Ira too, who is also with NASA. No chance that they'll get confused though. Ira Jr. is just a youngster, works as a file clerk.

NASA down-to-earth (Field Activities)

WHILE NASA is strictly space-minded and space-oriented, it has some very earthly moorings. In fact, its terrestial activities sprawl from one end of the continent to the other. Here are the NASA centers:

Langley, Va. Major areas of work here include research in structures and materials, the aerodynamics of re-entry vehicles, continuing work in aircraft and fundamental research in plasma physics. A major facility is scheduled to be added which will be able to simulate the gas temperatures and velocities which will be encountered by a space vehicle returning to the earth's atmosphere, something essential to the solution of key problems in space flight.

Cleveland, Ohio. Known as the Lewis Research Center, the primary research mission here is investigation of matters relating to propulsion. Programs are now underway on chemical rockets with emphasis on high energy propellants, on nuclear rockets and on electrical propulsion devices. Electrical power generation in connection with propulsion also receives major attention here.



LITTLE JOE space capsule test vehicle—approximately 50 ft. from fin tips to nose and having takeoff weight of about 28,000 lbs. — is shown during mating of the capsule to the booster system at NASA's Wallops Island Station, Wallops Island, Virginia.

Moffett Naval Air Station, Calif. This is known as the Ames Research Center and the principal areas of work here are space environmental physics, including simulation techniques, gas dynamics research at extreme speeds, and automatic stabilization, guidance and control of space vehicles. There are also under experimental evaluation here several full scale models of vertical take-off and landing craft.

Edwards, Calif. This is a relatively small but unique and highly specialized flight research center. On the edge of Rogers Dry Lake, it takes advantage of 75 square mile flat surface as an ideal testing ground for research aircraft. Present concentration is on the flight evaluation of the space vehicle X-15. It is expected that soon from here pilots will be propelled "substantially" above the earth's atmosphere and experience the characteristics of space flight for durations of several minutes.

Pasadena, Calif. This NASA center is a jet propulsion laboratory that is primarily interested in the exploration of deep space, including lunar and interplanetary flights. It is under contract to California Institute of Technology. A small portion of the staff is presently engaged in systems engineering of an Army weapon, the SERGEANT ballistic missile. The work done by this laboratory is extremely complex and imaginative and it is clear that a major portion of NASA resources will be going here in the years to come.

Wallops Island, Va. The numerous launchings of the sounding rocket program are conducted here. A solid propellant orbital vehicle is expected to be launched from here during 1960.

Lewis Research Center scientist holds hypothetical model of chemical rocket-propelled spaceship which is designed for eight-man trip between Earth and Mars satellite spaceports. Cargo booster in foreground would carry up parts to assemble spaceship in orbit above Earth.

Huntsville, Ala. This missile-creating center has been an Army facility, but the Administration wants to transfer it to NASA. The matter is now before Congress. The plan calls for the transferring of 5500 people under the leadership of Rocket Expert von Braun. The major project activity of the group at the present time is, and for some time will be, the development of the SATURN booster and the integration of the upper stages.

Greenbelt, Md. This activity will become known as the Goddard Space Flight Center and facilities for it are being built here. It is expected to become operational this summer. Major programs slated for this center include satellites, sounding rockets, manned space flight techniques, the application of space vehicles, principally passive communications and meteorology.

Cape Canaveral, Fla. NASA maintains a launching site here to carry out the firing of missiles developed at Huntsville.

Point Mogu, Calif. The plan is to launch spacecraft from here which will have polar orbits. ■

NASA CONTRACTING

by Harold Helfer/DATA

ERNEST W. BRACKETT, who is in charge of procurement for the National Aeronautics and Space Administration, likes to keep before him a facsimile copy of a Government contract. It called for one heavier-than-air flying machine, the price was $25,000 and the contractors were Wilbur and Orville Wright.

This initial effort in the flight age is not only an inspirational touchstone to Mr. Brackett, showing the great strides that can grow out of the most modest-seeming beginnings *(he has written on the white margin under the facsimile contract "From Little Acorns")* but it also serves as a whimsical reminder of how much more complex Government purchasing and procuring has become today.

Today it is likely to cost 10 times $25,000 for some company *just to get up the presentation of an idea* for something it thinks the Government might be interested in. And, in turn, it costs the Government thousands of dollars to study and evaluate the ideas and proposals that come in.

LIMITED PROPOSAL POLICY CONSIDERED

This has become such a complicated matter, both in terms of money expended as well as time and effort, that NASA is now seriously considering setting up a *Limited Proposals* policy.

That is to say, if NASA finds itself interested in the possibility of a certain project, it will get in touch with five or six concerns that could most likely handle this work well and efficiently. Otherwise, it might receive four or five times as many proposals in connection with this venture. By introducing the limiting factor NASA would save its own evaluating time and save many companies, which probably didn't have much of a chance to land the contract anyway, not only their time but the expense and trouble of working up a proposal.

But, you say, suppose you feel very deeply that your concern could handle a certain type endeavor, even if NASA had its doubts . . . is it fair to rule you out?

In those circumstances, NASA would accept your proposal for consideration. But, by setting up a "preferential list" for a certain project, it hopes to discourage "extraneous" proposals. If you don't receive an invitation to submit a proposal on a certain project, you are, in effect, being told: "We don't think you can handle this particular job we have in mind as well as some other companies. We think it would be a little foolhardy on your part to try to compete for this particular assignment."

NASA PROCUREMENT DONE BY FIELD ACTIVITIES

Meanwhile . . . and even if and when the Limited Proposal policy is adopted, which seems quite likely . . . there are these main things to remember about NASA procurement policy:

It is completely decentralized. Purchasing is done by the NASA centers themselves out in the field.

NASA SHOPS OUTSIDE

Unlike its predecessor NACA, which was mostly an in-house affair, 80% of NASA's expenditures will go to private business and industry.

Virtually all negotiated contracts are the cost-plus-fixed-fee variety (contractors are usually asked to submit the same types of cost breakdown and cost information usually requested by the military departments).

NO SYSTEMS MANAGER CONTRACTS

NASA does not go in for the systems concept of procurement. Contracts for a complete program are not placed with any one firm.

Philosophically, at any rate, if it may not always work out that way in each instance in actual practice, cost is a secondary concern with NASA. It realizes it has a big job to do—perhaps the biggest in the nation—and it wants to get on with it.

GODDARD CENTER DOES MOST BUYING

At the present moment the Goddard Center, whose offices are temporarily located in the Naval Receiving Center in the Anacosta section of the District of Columbia, is doing more buying than any of the other NASA centers. When the Huntsville, Ala., Army facilities come under NASA domain it too will become a big NASA buying center. Along with Langley Field, they will dominate NASA's research and development contracts. But considerable purchasing will be done at the other centers too.

CONTACT NASA CENTER NEAREST YOU

Your best bet, if you're interested in a NASA contract, is to contact the NASA center nearest you. If you happen to be coming into Washington, or if Washington is not too inconvenient for you to get to, it wouldn't be a bad idea to contact personally the procurement people at NASA Headquarters and get a "briefing" on NASA's overall needs and thinking.

JACOB ROEY IN D.C. HEADS NASA CONTACTS

Jacob Roey is in charge of NASA's business contact program and he or someone in his office will be glad to take time out to give you a fill-in. You don't really need an appointment but, if your time in Washington is going to be limited, it would be well to set up a date with Roey's office in advance because they're a pretty busy bunch and it might be you'll show up there (1520 H Street in downtown Washington; phone number, DU 2-7585) and find no one there who can talk to you.

NASA CURRENT SCHEDULE OF VEHICLE FIRINGS

FISCAL YEAR	1960*			1961			'62	'63	'64	'65	'66	'67	68	69
Redstone			1	2	3	2								
Atlas			1	2	1	2	1	6	1					
Juno II		1		1	3									
Thor - Able		2												
Atlas - Able			1	1										
Scout			4	2		2		6	6	6	6	6	6	6
Thor - Delta		1	1	1	2	1	1	5						
Thor - Agena B								1	6	6	6	6	6	6
Atlas - Agena B						1		3	4	5	6	3	12	12
Atlas - Centaur							1	5	4	5	6	9		
Saturn								2	2	3	4	4	4	4
Nova Type													1	2
TOTAL	12			29			28	23	25	28	28	28	29	30

* LAST TWO QUARTERS ONLY

If you live on the West Coast, NASA has a branch office in Santa Monica (150 Peco Street) that can give you an overall briefing. If one of NASA's centers is more conveniently located for you, you can probably get all the information you want to know there, even though your actual dealings might turn out to be with some other center.

In any event, particularly if traveling is out of the question at the moment, it wouldn't be a bad idea to write to NASA Headquarters, 1520 H Street, N.W., Washington, and ask for the pamphlet "Selling To NASA." (The publication is being revised at the moment, so you may have to wait a few weeks before you'll get it.)

SELLING NASA

When it comes to actually selling something to NASA or contracting for research and development, with negligible exceptions this is all done through the NASA centers. So the thing to do is file a Government Standard Form 129 with each of these centers and in this way be placed on the overall procurement source list.

You'll find NASA's system of making contracts quite similar to that of the military procurement offices. Each center has a Director of Procurement and Supply with a buying organization under him. If the contract is over $100,000 it will have to be approved by NASA Headquarters in Washington, but you yourself deal with the procurement people at the center.

NASA WORKS WITH MILITARY

NASA works closely with the military departments in its procurement work. It is, as a matter of fact, under the same statute for procurement as the military departments. Most of NASA's larger research development contracts are made with the same type of contractors as the Army, Navy or Air Force . . . and where one of these services has a contract administration organization in a contractor's plant this service generally takes over the administration of the NASA contract as well. If you've dealt with the armed forces, or if you do work in an area in which the military people would have some cognizance, NASA would ask the Department of Defense for advice on your capability and capacity to handle a certain project. *NASA sometimes will ask one of the military services to actually do the procurement for it on some item or matter which closely dovetails something with which the military has been involved.* Says Ernest Brackett, NASA's procurement chief; "By working with the military services, we not only save the expense of duplicate contract administration organizations, but business have only one agency and set of rules with which to deal."

An example of this NASA-DOD procurement tie-up is the fact that NASA is asking the Air Force to buy ATLAS boosters for some of NASA's space shots.

SEALED BIDS PREFERRED

NASA's policy though, in contrast to some Defense agencies, is to go in for sealed bid contracts whenever possible. However, this isn't considered feasible for pure research and development contracts and a cost-plus-fixed-fee policy takes over here. In a few instances, for rather small development contracts, NASA has used a fixed-price type with one of the standard redetermination of price provisions. A short time ago NASA made a five year requirements contract for liquid hydrogen which was formally advertised. NASA has not used the incentive type contract.

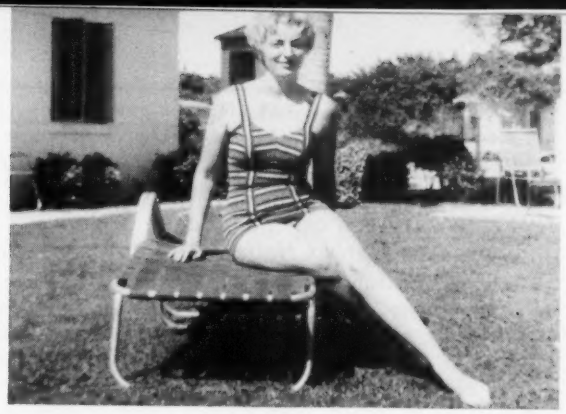
SHIP AND QUOTE

A rather unusual type of purchase order is used for purchasing standard items in small dollar amounts called "Ship & Quote." NASA orders the seller to ship the item and at the same time send his quotation with the provision the item can be returned if the price is felt to be unsatisfactory.

While so far NASA has not adopted the systems concept for procurement, making one company responsible for the complete working of an entire program, it is envisioned by NASA that "certain crash programs" may come along when it will be found it best to go in for an arrangement of this sort.

CHOOSING NASA CONTRACTORS

How does NASA go about choosing a contractor. This is what Procurement Chief Brackett told DATA: "Frankly, it is not easy. What we are aiming for in the development stage is to get the best engineering approach possible to assure success. Therefore, the largest weight is given to the technical part of a proposal plus the organization, including the engineers who would do the work. Cost is a secondary concern. There is no known formula for comparing estimates of costs which may be far less than actual costs, all of which the Government is obligated to pay, and the fixed fee is only one item to be considered."



As a reward for those of you who have read this far, here is a photo of NASA's bountiful blonde receptionist, Miss Pat Boyer. Unfortunately, you won't find her dressed like this at NASA Headquarters, but remember at NASA whether they speak of airfoil designs or women the motto is "It isn't skin area, it's contour that counts."

NASA SELECTION BOARDS

NASA uses a source selection board for all contracts when it is estimated that the cost of the program will exceed $1,000,000. Each NASA center appoints its own board with representation of at least one technical and one business management individual from NASA Hdqts. There also may be a technical and a business management working committee who will go into the details of proposals and evaluate them on a point basis. The weight given to each point is set up by the board but not given to bidders before proposals are opened.

No one is allowed to reveal any of the details of the board or committee findings. No "debriefing" is given the unsuccessful proposers. The reason: In order to explain to a company why it was not successful you'd have to show a comparison with other proposals of other firms and many "company secrets and ideas" might be revealed.

NASA AND SMALL BUSINESS

NASA seems to mean it when it says that it would like to see small business get a fair shake in the procurement end of things. Jacob Roey says he will "be happy to confer with any business concern at any time" and Brackett adds: "We are convinced the participation of small business concerns is not only vital to the national economy but we must have their help to carry out our program. There are many kinds of work that, because of the intimate direct relationships, can be done quicker with close understanding at less cost by a small business concern."

He also makes it clear: "Small business, of course, always can compete with larger concerns for some kind of work. At our Ames Laboratory, more than twice as many dollars went to small business as to large business."

There are, naturally, certain contracts that must of necessity be placed with companies with vast facilities. But NASA procurement people stress that even here there's an excellent chance for small business to play a part as subcontractors. For instance, NASA points out, while the Rocketdyne Division of North American Aviation got the big $100,000,000 contract for a single chamber rocket engine with a million and a half pound thrust, $68,000,000 of this money went to subcontractors and, of this amount, $40,000,000 went to firms that could definitely be classified as small business.

WHAT DOES NASA BUY?

What sort of things does NASA buy? Well, anything and everything, ranging from substantial amounts of standard supplies and equipment, such as sheet aluminum, machine tools and electrical parts to missiles. On the one hand, it has mundane construction contracts to offer, the building of homely terrestrial structures, personnel quarters, store houses, etc., and, on the other side of things, it is also concerned with Project Mercury, that most wonderous and electrifying of all ideas and thoughts, getting a man up into space.

What is the range of fixed fees that NASA allows? There is no hard-and-fast formula for this, but it's about the same as allowed to military research and development contracts—if anything, perhaps a little less. One of the larger contracts recently placed was at a fee had asked. That's fairly typical. NASA's policy is to try to place contracts with companies that have the required facilities or will erect them at their own money rather than have the Space agency furnish the facilities. When it can, NASA also contracts for commercial services and products, such as liquid oxygen, rather than having to set up Government-owned plants.

NASA procurement people are proud of the fact that it has been able to place its contract with what, from a Government standpoint anyway, is a "minimum of red tape." Some of its largest contracts have been negotiated, written, approved and distributed within three months or less. Says Procurement Officer Brackett: "This is because we are a small organization and can move fast, but it does not mean we do not do a thorough job of pricing or other details. Also, we want companies to feel NASA is a friendly place with which to do business."

FUTURE NASA PROCUREMENT

It is not anticipated that, immediately, many substantial *production* contracts, which is where the real profits for industry comes, will develop. But NASA's future is almost as big and broad as space itself. The Space agency's head, T. Keith Glennan, anticipates that in a couple of years, NASA spending will thrust itself from the $900,000,000 it will spend this coming year to possibly two billion dollars or more. *And it is clear that concerns, big and small, are beginning to orbit themselves around NASA not because of present profits but because they want to get in on the ground floor of something that they know has, literally, an ever-expanding and limitless future.* ■

DATA FEATURE

THE GAO STORY

"We Just Want The Facts, Ma'am"
Harold Helfer/DATA

GAO Building

Of all the government agencies, probably none is less familiar to the public at large than the General Accounting Office.

For one thing, it doesn't even sound particularly like a governmental set-up. It would seem to be an adjunct of some insurance company or a steel firm or almost any corporation of any size.

And no matter how you say General Accounting Office there just doesn't seem to be anything particularly romantic or dynamic about it.

Yet the GAO, as it's generally referred to among the knowledgable ones in governmental circles is about as potent and powerful a government function as there is going.

If, as is sometimes bruited about, money talks, General Accounting Office has quite a say.

Right now, GAO is in a hassle with the Navy over its ship overhauling policies. The GAO says that the Navy overhauls ships being transferred to foreign allies until they are in better condition than those in the U. S. fleet itself. And, furthermore, the GAO also lets it be known that the Navy has overcharged the mutual security program for some of the materiel going into foreign aid. What is more, as always, GAO is prepared to give facts and figures and to cite chapters and verse. It pointed out that the Navy had spent $590,000 to $635,000 in repair bills for ships it was turning over to foreign countries, while the previous times these ships were being overhauled, when the Navy was doing this for itself, the bills came to only from $140,000 to $172,000.

So, at the moment, it is the Navy and its ship overhauling program that the GAO is rapping over the knuckles. Next week it may be the Air Force and some of its missile contracts, a few days later it may be the Army and its tank procurement dealings that are being raked over the coals.

Fiscally speaking, the General Accounting Office is as big as the government itself, the sum total of all its parts.

Every penny that the government spends is appropriated by Congress. And the GAO was created by Congress to serve as its "watchdog" to see to it that this money was properly spent.

As a matter of fact, one of the things that makes the GAO so strong is that it is even independent of Congress itself. That is to say, its people are not in jeopardy of their jobs regardless of the party, regime or clique who might be running things on the Hill at the moment. The comptroller general, the man who heads the GAO, is appointed to his office for 15 years. The accountants and lawyers connected with GAO are career people, protected by Civil Service. Next to the Supreme Court, probably no other agency can exercise its functions in so completely an aloof and independent way, above the hue-and-cry and the pressures to which most governmental departments are subjected.

NOSE POKER

The GAO has the right to look at any and all contracts which the government makes. If it is a negotiated contract rather than a sealed bid affair . . . and, this may be a surprise to some, but the great bulk, from 80 to 90% of governmental contracts are of the negotiated variety . . . then the General Accounting Office actually has the power to examine all the books and records of the company in regards to any particular contract.

By poking its nose in Defense Department contracts alone, GAO, in the last fiscal year, was able to "recover" $15,000,000 for the government!

Taking all governmental contracts in consideration, and considering further other money matters besides contracts, GAO in that fiscal year was able to bring some $60,000,000 back into governmental coffers that had somehow managed, inadvertently or otherwise, to have flown the coop.

The GAO is not a particularly popular agency. Quite often not only the contractor but the government agency that made the contract is displeased by some action on the part of GAO. This is because, as likely as not, if something out of line shows up in a contract it is something of a reflection on the government agency that made it for having allowed it to occur. Also, the government agency "has to live" with the contractors and it would rather have happy and contented people to deal with it then miffed and riled-up ones. This is particularly true with the Department of Defense, which is faced with the space age challenge as well as on many down-to-earth military fronts, and so finds itself also faced with much pressure to get out operational stuff of one sort or another as quickly as possible.

The fact that they may not get invited to all the office parties is something GAO emissaries . . . and they not only have established themselves places in Defence bivouacs about Washington but have offices overseas too, in Paris and Tokyo . . . shrug off and have learned to live with. That's life, they say. They know they are regarded by some as fishy-eyed bookkeepers, busybodies and shylocks.

But they have a job to do, they say, and they try to do it. It may not be the most lovable-type job in the world, but somebody has to do it. If some feathers are ruffled in the course of events, well, let the feathers flutter where they may.

With the government spending something like $70,000,000 every year and literally millions of contracts in the works, can the GAO really examine every contract?

The answer is no. Congress's "watchdog" sort of operates like the Income Tax people. It will delve into cases which for one reason or another it feels may turn up "something interesting." And then, like Internal Revenue, GAO also will do a certain amount of "sampling" as a matter of routine.

There's a difference though between Internal Revenue and GAO sampling. Internal Revenue endeavours to sample a certain percentage of all income tax returns that come in, pretty much clear across the board. GAO is more selective.

For instance, during one year it might decide to go into some guided missile contracts, as much for its own edification of what is involved as anything else. If it turns out that among these contracts checked there was a tendency to overcharge the government in certain aspects of missile work, then GAO might decide to take a hard and fast look at all guided missile contracts.

GAO also is inclined to be interested in contracts in which there are no end products involved, such as in the basic research area, especially if the concern with the contract appears to be the only one doing that kind of work. GAO says to itself, now this is a situation which, since there are no comparative figures or similar work studies, and, since, further, there are no obvious tangible results to judge by, Uncle Sam could have been taken on some kind of a skyride, we'd better have a look into this, just for the heck of it.

REASONABLE vs. EXCESSIVE?

How does GAO decide when some concern is making a *reasonable* profit and when an *excessive* one? . . . what is the guideline or rule-of-thumb on this?

Well, GAO has none. It really isn't concerned about the contract profits, as such. That's undoubtedly a popular misconception. What the GAO is after is just the facts, ma'am, just the facts—especially as relating to the cost end of the contract.

In other words, if such-and-such company has made a profit of $1,750,000 on a certain contract, GAO has nothing to say about that. But what GAO will take exception to is this such-and-such company saying, in estimating its contract cost to the government, that the lumber it was going to use would cost $500,000, when, in fact, it turned out to cost only $100,000. Also, the company might have put in the contract a $200,000 item for expert skills for a portion of the job when, in fact, it got along without these skills, and things like that.

If such matters as these come to light, then the GAO says to the Army or the Navy or the Coast Guard or whoever negotiated the contract and says, look here, this contractor seems to have padded his contract costs and we think you ought to get this money back. The agency then proceeds to endeavor to do just that and that's how the government gets the "rebate" money mentioned earlier.

If a company balks about giving any of this money back, it can be taken to court. If it appears that this cost differential was not so inadvertent, that it may have been deliberate, that there was out-and-out skullduggery afoot, then the GAO can turn the matter over to the Department of Justice for criminal prosecution.

While the GAO might have a sort of mother-in-law status as far as many companies are concerned, just as in family life, it really ill behooves anyone to get too persnickety and high-handed with mother-in-law. It somehow can just irritate the situation that much more. In the case of government contractors, if one gets the reputation of playing footsies with the cost figures, and then is a boor about making the proper amends, he is liable to find himself in bad graces with Uncle Sam and lose out in future contracts.

THE OTHER SIDE OF THE COIN

Also, for whatever consolation it may bring, it is a fact that if some company should perchance *underestimate* its costs then it can come forward and ask the government for more money than the contract called for. And the GAO may acknowledge that there is something to be said for the contractor's point of view and *there are* "refunds" made from time to time.

GAO hews to the line that it just wants to be fair about things. All it wants to do, it says, is bring everything out into the open, have all the facts of contract life squarely on the table . . . let the feathers or the chips or whatever fall where they may.

Of course, the very fact that GAO is in existence has a tendency to keep some companies, which otherwise might conceivably be inclined to be a little footloose and fancy-free with some of its contract figures, show more restraint and reserve. And government agencies are inclined to watch their steps too, since, if an agency appears to favor one contractor over another, for no real fiscal reason, what do the would-be contractors who feel slighted do? Right—they yell to their congressmen. And what does the congressman do? He contacts the GAO and asks it to look into the situation and see about all this. And the GAO does look into matters of this sort.

Another thing that puts the GAO in such a powerful position is that it not only serves as accuser but as judge too. It interprets the fiscal policy of Congress. It can tell a government agency, for instance, no, you can't spend so much money for this sort of thing, this is not the way Congress intended the money and what the comptroller general (currently Joseph Campbell, a former Columbia University fiscal official), the GAO head, says about these things is the way things are. Sometimes agencies, in a huff about some matter or other, bring all the pressure they can to get the comptroller to change his mind, but it doesn't often have much effect.

That's the thing about this GAO. It's so darn independent. That's what distinguishes it from much of the rest of the government—why, it's as independent as some of the taxpaying citizens, whose best interests it is trying to look out for.

DATALOG OF MISSILE, SPACE, AND DETECTION PROJECTS

MILITARY MISSILES, March 1960

★ *New information this month*

AA—Air-to-Air
AS—Air-to-Surface
AU—Air-to-Underwater
SS—Surface-to-Surface
SA—Surface-to-Air
SU—Surface-to-Underwater
UU—Underwater-to-Underwater
ICBM—Intercontinental Ballistic Missile
IRBM—Intermediate Range Ballistic Missile
ECM—Electronic Countermeasures

ASROC Navy

Type: SU
prime: Minn.-Honeywell

Solid rocket-powered nuclear torpedo. Sked. for fleet use early '61.

ASTOR Navy

Type: SU
prime: Westinghouse

Being produced by Westinghouse.

ATLAS SM-65 AF

Type: ICBM
prime: Convair
guide: GE/Burroughs/Am. Bosch
power: Rocketdyne
weight: 260,000 lbs.
length: 75 ft.
dia: 10 ft.
range: 5500 naut. mi.

★ Atlas flop on March 10 ended streak of 22 successes. Score to date: 47 firings, 30 successful, 8 partial, 9 failures.

BOMARC IM-99 AF

Type: SA
prime: Boeing
guide: Westinghouse
power: A—Marquardt
B—Thiokol
funding: $421.5 million on BOMARC-B in FY 61
speed: Mach 2.7
range: 500 mi.

★ After 7 firings BOMARC is called unsuccessful by most AF and Congressional sources. New Model "B" with solid booster expected to be much better.

BULLPUP ASM-N-7 Navy GAM-83 AF

Type: AS
prime: Martin
guide: radio command
Republic
power: Thiokol
weight: (ASM-N-7) 250 lbs.
range: 4 mi.

WHITE LANCE GAM-83 is larger model now in development for AF use.

CLAM AF

Type: AS
power: Ramjet
No contracts announced.

Counter measure low altitude missile listed in AF missile specifications book.

CLAYMORE Army

Type: SS
No contracts announced.

Anti-personnel weapon of short range. Designed for troops in field.

COBRA Navy

Type: ECM
No contracts announced.

Proposed missile to confuse enemy ship-based radar. Project lagging. Name may be changed.

COBRA USMC

Type: SS
prime: Boelkow Entwicklunger, W. Germany (distrib. U.S.: Daystrom)
guide: wire guided
power: Solid BE
weight: 24.6 lbs.
speed: 191 mph.
range: 1 mi.

★ Anti-tank missile now operational with W. German forces being purchased by USMC for evaluation. 100 purchased by USMC. Army also plans evaluation.

CORPORAL SSM-A-17 Army

Type: SS
prime: Firestone
guide: Gilfillan
power: Ryan
range: 75 mi.

Phasing out in favor of SERGEANT. NATO troops using, some US forces in Europe still have CORPORAL.

CORVUS XASM-N-8 Navy

Type: AS
prime: Temco
guide: Texas Instrument
power: Reaction Motors
range: 100 mi.

New model being dvlpd as countermeasure (ECM) bird. First fired July '59.

CROW Navy

Type: AA

★ Top Navy source says CROW is Soviet Yak 14, under test by Navy.

DAVY CROCKETT Army

Type: SS
prime: Rock Island Arsenal

Bazooka-launched field weapon with low nuclear yield. Can be hand-carried. Sked to be operational latter part 1960.

EAGLE XAAM-N-10

Type: AA
prime: Bendix
guide: Bendix/Sanders
power: Aerojet
range: 100 mi.

EAGLE won out in political battle against GAR-9 FALCON. Navy has high hopes for EAGLE as attack missile with nuclear warhead, launched from carrier a/c appx. 50 miles from target. Provides safety for manned fighters of relatively slow speeds.

DATALOG OF MISSILE, SPACE AND DETECTION PROJECTS (2nd Sheet)

MILITARY MISSILES, March 1960

★ *New information this month*

FALCON GAR-1, -2, -3, -4, -9, -11 AF

Type: AA
prime: Hughes
guide: Hughes
power: Thiokol
speed: Mach 2.0
range: 5 mi.

★ GAR-3 is operational, SUPER FALCON GAR-3 in test. GAR-2 and 4 are Infrared guided. GAR-9 is radar guided with nuclear warhead. GAR-9 now being cut back in production. GAR-11 is in R&D.

GENIE MB-1 AF

Type: AA
prime: Douglas
guide: unguided
power: Aerojet
range: 1.5 mi.

★ Now being carried by F-89J, F101B and F-106. First operational nuclear warhead air-to-air bird, GENIE is pointed downward at launch, curves up at target. Unguided with spin-stabilization. Guided version in R&D.

GIMLET Navy

Type: SA
No contracts announced.

This air-launched rocket is said to have high accuracy. Most details, however, are being withheld by Navy.

HAWK XM3E1 Army

Type: SA
prime: Raytheon
guide: Raytheon
power: Aerojet
range: 20 mi.

★ Now operational, will be used by both Army and Marine Corps troops against low-level targets. Modified model with better performance now in R&D.

HONEST JOHN M31, XM50 Army

Type: SS
prime: Douglas
guide: unguided
power: Hercules Powder
range: 17 mi.

★ Operational with U.S. forces in Europe. Little John to replace Honest John for less than maximum ranges. XM50 is increased ranged M31 with greater accuracy.

HOUND DOG GAM-77 AF

Type: AS
prime: North American
guide: Autonetics
power: Pratt & Whitney (J52)
funding: $170 million in FY61
speed: Mach 1.7
range: 500 mi.

★ Now operational with SAC. Comparable Soviet missile is said to be USSR's KOMET D.

JUPITER SM-78 Army-AF

Type: SS
prime: Chrysler
guide: Ford Instrument
power: Rocketdyne

Operational with Italian and Turkish troops in Europe. The 864th and 865th squadrons of SAC trained with JUPITER. THOR replacing. Will be used as target for anti-missile weapons.

LACROSSE SSM-A-12 Army

Type: SS
prime: Martin
guide: Federal Tel.
power: Thiokol
range: 20 mi.

This weapon is unique in its design to place a very heavy warhead under command guidance on a battlefield target. LACROSSE is under limited production and is operational. Production is being handled by Martin at Orlando. Two units are scheduled to go to Germany in March and April.

LITTLE JOHN Army

Type: SS
prime: Emerson Elec.
guide: unguided
power: Allegheny
range: 10 mi.

Designed for "shoot and scoot" operations, LITTLE JOHN will soon be operational.

LULU Navy

Type: AU
No contracts announced.

Air dropped nuclear warhead anti-sub missile is highly classified by Navy. Now undergoing development. No contract announced.

MACE TM-76 AF

Type: SS
prime: Martin
guide: AC Spark/Goodyear
power: Allison (J33-A-41)
funding: $39.8 million in FY 61. No renewal.
range: (B) 1000 mi.

Now in W. Germany with U. S. Forces. The "B" model has better performance. Funding ends for MACE in FY 61.

MATADOR TM-61 AF

Type: SS
prime: Martin
guide: Goodyear
power: Allison (J33-A-37)
range: 650 mi.

Production has now ceased in favor of MACE. MATADORS being turned over to West Germans and Natl. Chinese.

MAULER Army

Type: SA
prime: Convair

★ Infra-red guided anti-air weapon has been designed for field-troop use. Sub-contractor is Raytheon. Project is still going ahead strong.

MINUTEMAN SM-80 AF

Type: ICBM
prime: Boeing
guide: Autonetics
power: Thiokol (solid)

MINUTEMAN is expected to become operational by late 1962 or early 1963. Some trouble has been encountered in the single fixed nozzles of the solid propellant motors. MINUTEMAN will be made mobile by RR launch.

(3rd Sheet) **DATALOG OF MISSILE, SPACE AND DETECTION PROJECTS**

MILITARY MISSILES, March 1960

★ *New information this month*

MISSILE A Army

Type: SS
No contracts.
range: 70 mi.

★ This solid fuel missile is designed as fire support for infantry. It's light weight (under 500 lbs.), simple operation, and transportability by helicopter, make it ideal for field use. Evaluation has been completed by the Army. Contracts should be announced soon.

NIKE-AJAX SAM-A-7 Army

Type: SA
prime: Western Electric
guide: Western Electric
power: Hercules Powder
speed: Mach 2.5
range: 25 mi.

Operational in U. S., Europe and Far East. Being replaced by NIKE-HERCULES. Non-nuclear.

NIKE-HERCULES SAM-A-25 Army

Type: SA
prime: Western Electric
guide: Western Electric
power: Hercules/Thiokol
funding: $111.4 million in FY 61
speed: Mach 3.2
range: 80 mi.

Work continuing rapidly on conversion of NIKE-AJAX sites to NIKE-HERCULES. This fine weapons system appears slated for long retention in our anti-aircraft protection arsenal. Nuclear head.

NIKE-ZEUS Army

Type: SA
prime: Western Electric
guide: Bell Telephone
power: Grand Central Rocket
range: 200 mi.

★ Altho still plagued with difficulties in reliability, NIKE-ZEUS is proceeding to operational status rapidly. Critics say it is too slow. Total score to date (March 10, 1960) 5 total NIKE-ZEUS firings, 4 successful, 1 partial.

PERSHING Army

Type: SS
prime: Martin
guide: Bendix
power: Thiokol
range: 700 mi.

★ Limited short-range test, February 25, proved successful. It is designed to replace REDSTONE.

POLARIS FBM Navy

Type: US-SS
prime: Lockheed
guide: GE
power: Aerojet
range: 1000 mi.

★ About 40 POLARIS firings are on sked. for 1960. To date (March 10, 1960) 53 POLARIS missiles have been fired. 36 of them successful, 15 partial, 2 failures. The test of March 9 marked the 7th success in the last 8 firings. Original goal of 1500-mi. range still not achieved. Navy's POLARIS now has Soviet competitor in USSR's GOLEM IV, similar underwater-to-surface missile.

QUAIL GAM-72 AF

Type: AS-ECM
prime: McDonnell
guide: radio command
power: GE (J85)

Air-launched diversionary missile of extreme sophistication and complexity is valuable aid in protection of SAC bombers.

RAVEN XASM-9 Navy

Type: AS
No contracts announced.
range: 500 mi.

Proposed air-to-surface range: 500 mi missile now under study. Project appears to be lagging.

REDEYE Army

Type: SA
prime: Convair
guide: Convair
power: Atlantic Research

Lightweight (20 lb.) infra-red guided bazooka-type missile well along in testing. Army has high hopes for this relatively inexpensive and effective easily-carried guided missile that can be fired from a soldier's shoulder.

REDSTONE SSM-A-14 Army

Type: SS
prime: Chrysler
guide: Ford Instrument
power: Rocketdyne
range: 200 mi.

Now operational with U. S. troops in Europe. REDSTONE being phased out in favor of PERSHING.

REGULUS I SSM-N-8 Navy

Type: SS
prime: Chance Vought
guide: AC Spark Plug
power: Allison (J33)

Although cut in production, REGULUS I is aboard some ships and subs of the U. S. fleet and is operational. Biggest news with REG I, however, is not its current Navy dress but the fact that it has been used in "missile mail" tests by the Post Office Dept.

REGULUS II SSM-N-9A Navy

Type: SS
prime: Chance Vought
guide: Stavid/Sperry/AC
power: GE (J79)
range: 500 mi.

Much more powerful and larger version of REGULUS I, REG II has also been cut from Navy funding but also is being eyed by Post Office Department as speedy ("beyond Mach 2") missile mail carrier that could fly in any weather. Now being used in fleet as target drone.

MILITARY MISSILES, March 1960

★ *New information this month*

SERGEANT SSM-A-27 Army

Type: SS
prime: Sperry
guide: Sperry
power: Thiokol
range: 75 mi.

Easily assembled in field in about 11 minutes, smaller, more flexible solid propellant SERGEANT is now in production to replace Army's CORPORAL. Nearly operational.

SHILLELAGH Army

Type: SS
prime: Aeronutronics
guide: Aeronutronics
power: Picatinny Arsenal
range: 8 mi.

★ As a sub-contractor, Raytheon is developing the fire control sub-system. The electronics computer for guidance and control of the light-weight troop support missile is also by Raytheon. The weapon is ideal for close-in troop support.

SIDEWINDER AAM-N-7 Navy GAR-8 AF

Type: AA
prime: Philco
guide: Philco/GE
power: Hercules Powder
range: 7 mi.

Extremely popular infra-red homing missile is simple and rugged. SIDEWINDER-1C is advanced model with higher speed and greater range. Advanced model is in test. All-weather version now in R&D.

SKY BOLT GAM-87A AF

Type: AS
prime: Douglas
guide: Nortronics
power: Aerojet
range: 1000 mi., a/c launch

★ This air-launched missile will be a great aid to SAC. Test flights in process.

SLAM AF

Type: SS
No contracts announced.

Supersonic low altitude missile. Contractors now being selected.

SNARK SM-62 AF

Type: SS
prime: Northrop
guide: Northrop
power: Pratt & Whitney (J57)
speed: Mach 0.9
range: 5500 mi.

Highly reliable guided winged missile. Subsonic. Operational with AF unit at Presque Isle, Maine. To be replaced by ballistic types.

SPARROW III AAM-N-6, 6A Navy

Type: AA
prime: Raytheon
guide: Raytheon
power: Thiokol

★ With pre-packaged Thiokol powerplant, top Navy officials feel "SPARROW III is finest electronically guided missile in the world."

SS-10 Army

Type: SS
prime: Nord of France
weight: 33 lbs.
range: 0.9 mi.

Wire guided anti-tank weapon. Operational with U. S. and NATO forces. Used by the French in Algerian battles with success.

SS-11 Army

Type: SS
prime: Nord of France
weight: 63 lbs.
range: 2 mi.

Can be carried and launched by helicopter as well as by troops in field. Operational with French forces. Under study by U. S. Army.

SUBROC Navy

Type: SU-UU
prime: Goodyear
guide: Librascope/Kearfott
power: Thiokol
range: 25-50 mi.

This complex weapons system is launched through a torpedo tube of a submarine or surface vessel. Rising, it flies from 25 to 50 miles through the air, then re-enters the water and homes on its submerged target. Key to perfection of the system is reliability and range of built-in sonar equipment. Work is now continuing along that line.

TALOS SAM-N-6 Navy

Type: SA
prime: Bendix
guide: RCA/Sperry
power: McDonnell
speed: Mach 2.5
range: 65 mi.

Unique in its integral ramjet body, TALOS is now operational aboard the guided missile cruiser GALVESTON.

TARTAR Navy

Type: SA
prime: Convair
guide: Sperry
power: Aerojet
length: 15 ft.
dia: 1 ft.
speed: Mach 2.0
range: 10 mi.

A miniaturized TERRIER that has performance equal to the larger bird, TARTAR is a 950-lb. beam rider. TARTAR is scheduled to be operational in 1960. Test firings now going on in Pacific waters.

TERRIER SAM-N-7 Navy

Type: SA
prime: Convair
guide: Sperry
power: Allegheny
length: 27 ft.
speed: Mach 2.5
range: 10 mi.

★ Beam riding missile for use on larger surface ships, TERRIER is operational with the fleet. For info on SUPER-TERRIER see TYPHON.

(5th Sheet)

DATALOG OF MISSILE, SPACE AND DETECTION PROJECTS

MILITARY MISSILES, March 1960

★ *New information this month*

THOR SM-75 AF

Type: IRBM
prime: Douglas — power: Rocketdyne
guide: AC Spark Plug — range: 1500 mi.

★ Now operational, THOR missiles in U. K. now form 4 units of the Royal Air Force Bomber Command. In its role as a research vehicle, THOR has served as an effective first stage booster, most capably shown in the THOR-ABLE lunar probe combo. March 11 shot was 25th for this combo. Score: 20 successes, 3 partial and 2 failures.

TITAN SM-68 AF

Type: ICBM — power: Aerojet
prime: Martin — length: 90 ft.
guide: Bell/Am. Bosch/Rem. Rand — range: 5500 mi.

The spectacularly successful TITAN launching of 2 Feb. 1960, brought new hope and increased favorable public opinion for the TITAN. However, due to increased reliability of ATLAS and earlier stigma of tempermentalness of TITAN, project may still be cut. Program now in critical appraisal.

TYPHON Navy

Type: SA-SS

★ Under dvlpt. by Navy. New name for SUPER TALOS (medium range TYPHON) and SUPER TERRIER (short range TYPHON).

WAGTAIL AF

Type: AS
prime: Minn-Honeywell
guide: Minn-Honeywell
power: not releasable

This remarkable rocket will be able to follow contours of terrain and change speed in flight. WAGTAIL has been successfully sled-tested.

WEAPON ABLE Navy

Type: SU
No contracts released.
BuOrd "in-house"

Operational with the fleet, WEAPON ABLE is rocket-powered depth charge now installed on destroyer escorts and class 931 frigates.

ZUNI Navy

Type: AS
No contracts released.
NOTS produced.

Operational with carrier based a/c, ZUNI is a folding fin all-weather unguided rocket carried in multiple units. The Douglas AD a/c carry 48 ZUNIs below their wings on combat missions. The weapon is effective against pill-boxes, tanks, gun emplacements and small ships.

SPACE PROJECTS, March 1960

AGENA ARPA

Type: Liquid-fueled Upper Stage
prime: Lockheed
Obj: AGENA will be useable as a second stage to ATLAS and THOR missiles. It incorporates a Bell rocket engine similar to that used previously in the HUSTLER vehicle. The AGENA upper stage is used in DISCOVERER, MIDAS and other projects. AGENA and SATURN are part of PROJECT TRIBE.

ATLAS-ABLE NASA

Type: Large Booster
prime: Convair/Space Tech Labs
guide: GE/Burroughs/Am. Bosch
power: Rocketdyne/Aerojet
Obj: Designed to orbit 200-lb. satellite around moon.

Initial shot in November failed. Similar shots now delayed until late 1960. However, plans now underway for more ATLAS-ABLE vehicles. Much interest in ATLAS-ABLE combo.

CENTAUR NASA

Type: Soft-Land Moon Vehicle
prime: Convair
power: P&W/JPL
Obj: Designed to land 730-lb. payload on moon in soft landing.

CENTAUR is first Heavy Duty Space Vehicle. Capable of orbiting a 10,000-lb. satellite payload at 300-mi. altitude or 2500-lb. payload at 22,000 mi. altitude. The 22,000-mi. alt. is significant because at that ht. satellite matches earth rotation and stays over fixed pt. Using 3 or 4 such satellites as radio relay pts. U. S. could have global communications net.

COURIER ARPA (Army)

Type: Communications Satellite
prime: Philco
Obj: Designed to be delayed repeater satellite, part of PROJECT NOTUS.

First firing sked. for end of April '60, but project may be cancelled before that time. COURIER now in critical review.

DECREE ARPA (Army)

Type: Global Communications Satellite
prime: no contracts announced
Obj: Designed to be global communications system with satellite repeaters remaining stationary distances from each other.

Part of NOTUS, will be transferred from ARPA to Army eventually.

PROJECT DISCOVERER AF

Type: Stabilized Satellites
Obj: (a) Achieve orbital capabilities of large satellite vehicles.
(b) Dvlp techniques and data for operational military satellite systems.
(c) Recover by use of suitable re-entry capsule for biomedical and other studies.
(d) Execute nonrecoverable advanced engineering tests.
(e) Such other objectives as may be directed.

Tasks: **DISCOVERER** satellites
Prime: Lockheed
Has achieved orbital capabilities and has made successful re-entries. Ejected capsules have not been recovered.
MIDAS Satellites
Prime: Lockheed
In R&D, Early Warning Satellite dvlpd to spot enemy ICBM launchings by infra-red.
SAMOS Satellites
Prime: Lockheed
Originally called SENTRY, first launching scheduled for March 1960.

SPACE PROJECTS, March 1960

★ *New information this month*

DYNA-SOAR I AF

Type: Boost-Glide Orbiting Vehicle
prime: Boeing (for Glider)
Martin (for Booster)
guide: not announced
power: not announced
Obj: Will attempt to put manned glider into orbit for pilot to return.

Boeing's space bomber is sked. to be operational by 1970 at current funding. Increasing interest in DYNA-SOAR could put project on crash speed basis and achieve operational readiness by 1966.

PROJECT ECHO NASA

type: Inflatable Satellites
Obj: Global communications experiment.

Aluminum-coated inflatable spheres, each as tall as a 10-story bldg., being launched by NASA to use as targets for radio waves. Launching in Jan. 1960 from Wallops Island, Virginia was huge success. More ECHO firings planned.

JUNO II NASA

Type: Large Booster guide: Ford Instrument
prime: Chrysler power: Rocketdyne/JPL
Obj: Attempts to put small payloads deep in space.

Five more JUNOs will be fired.

MERCURY NASA

Type: Manned Satellite guide: not announced
prime: McDonnell power: ATLAS (Rocketdyne)
Obj: Will attempt to put man in brief orbit, then parachute him in capsule safely to earth.

Interest in the MERCURY project seems to be waning. REDSTONE firings with monkeys being recovered have not kindled the American public to flaming pride as was hoped. Manned firings are still a long way off.

MIDAS WS 117L AF

Type: Early Warning Satellite
prime: Lockheed
Obj: Infrared sensing of enemy ICBM launchings.

Also part of the original SENTRY program and now handled in the DISCOVERER series. MIDAS has been initiated to dvlp an early warning system of defense against ICBMs wherein the heat from the missile motors is detected at time of launch. Infra-red detection is used. Still in dvlpmnt. MIDAS came to AF via ARPA.

MRS. V ARPA

Type: Maneuverable, Recoverable Manned Space Vehicle
No contracts announced
Obj: Will attempt to place manned vehicle in orbit, then maneuver out of original orbit in space, then return safely to earth.

This project is also known as DYNA-SOAR II. Vehicle will weigh in excess of 20,000 lbs. Launch may be from or in space.

NOVA NASA

Type: Large Booster
prime: Rocketdyne
power: Rocketdyne
Obj: Will build 6 million lb. thrust booster for Outer Space Vehicles

Rocketdyne's 1.5 million lb. thrust engine is heart of this system. NOVA will be cluster of 4 such engines. Engine in early dvlpmnt now.

Progress in project now lagging.

ORION ARPA

Type: Rocket propelled by nuclear pulses
prime: General Atomic
Obj: Nuclear powered Outer Space Vehicle

Work was undertaken in July '58 by Gen. Atomics Div. of General Dynamics under a $1 million contract with ARDC. An additional $400,000 was authorized by ARPA at end of year for continuation of study. In Aug. '59 another $1 million for continuation of nuclear pulse rocket studies was authorized. Moving slowly now from drawing board to basic testing stage.

PRINCIPIA ARPA

Type: Solid Propellants
prime: no contracts announced
Obj: Dvlping new solid propellants with 10-20 percent higher specific impulses.

PONTUS ARPA

Type: Material Research
prime: no contracts announced
Obj: Experimentation and dvlpmnt of better structural and power conversion matls for military requirements in surface, air and missile programs.

SAMOS WS 117L AF (via ARPA)

Type: Reconnaissance Satellite
prime: Lockheed
Obj: TV Satellite

Originally called SENTRY, the SAMOS is part of the DISCOVERER series designed to be a "Peeping Tom" on enemy military capabilities. It is scheduled for initial launch in March 1960.

SATURN NASA

Type: Large Booster
prime: Convair
power: Pratt & Whitney
Obj: Clustered 1.5 million lb. thrust booster for Outer Space Vehicles.

Recently transferred from Army to NASA control along with Von Braun and SATURN project officers and tech people. SATURN with two stages above it—probably TITAN and CENTAUR—could send 20,000 lbs. to moon or put heavy probe deep in space. First launchings are scheduled to be in early 1963.

SCOUT NASA

Type: Four-stage Satellite Launch Vehicle
prime: Chance Vought
guide: Minn-Honeywell
power: Aerojet/Allegany/Thiokol
Obj: Designed to place 200-300 lb. satellites in orbit.

Some delays in this 4-stage rocket has caused sked. operational date to now be late summer 1960.

SHEPARD ARPA

Type: Tracking Satellite
prime: no contracts announced
Obj: Tracking and data reduction

This satellite will soon come into more prominence. It is needed.

STEER ARPA

Type: Communications Satellite
prime: Bendix
Obj: Destined to serve the Strategic Air Command for communications purposes, STEER is part of the NOTUS project. STEER will be launched in a polar orbit. Still in R&D. Army will dvlp the satellite, AF will launch it.

(7th Sheet)

DATALOG OF MISSILE, SPACE AND DETECTION PROJECTS

SPACE PROJECTS, March 1960

★ *New information this month*

SUNRISE ARPA

PROJECT SUNRISE will make studies of advanced military weapons with special concentration on space delivery.

SUZANO ARPA

Type: Space Platform prime: no contracts announced
Obj: Designed to provide space platform for assembling Outer Space Vehicles, and to be used as a springboard base for advanced space missions.

Project being cancelled for lack of funds and as necessary "must go" in ARPA shake-up.

THOR-ABLE NASA

Type: Large Booster guide: GE
prime: Douglas/Space Tech Labs power: Rocketdyne/Aerojet
Obj: Designed for deep space probes of lighter payloads than ATLAS-ABLE.

Good reliability has been had with this combination. Uses continuing for putting probes deep in space and for moon and sun orbit shots. Latest shot, March 11, send a 90 lb. "planet" toward orbit around the sun between Earth and Venus.

THOR-DELTA NASA

Type: Satellite Launching Vehicle guide: ITT
prime: Space Tech Lab power: Aerojet/Allegany
Obj: Designed to put small satellites (50-80 lbs.) into orbit around moon.

First flights scheduled for early 1960.

TIROS NASA

Type: Meteorological Satellite
prime: RCA
Obj: Designed to take television pictures of cloud formations and frontal systems.

TIROS promises to give more revelations about nature of weather. Army Signal R&D Labs at Fort Monmouth involved in initial planning. Navy is also fostering TIROS. Shot is planned for mid-year 1960.

PROJECT TRANSIT ARPA

Obj: Astro-Geodetic Navigation Satellite

PROJECT TRANSIT has been encountering delays due to booster problems and voices questioning current need for the project. Shot sked. for February now sked. for March.

PROJECT TRIBE ARPA

Obj: Outer Space Vehicles

PROJECT TRIBE is a research, experimentation and systems dvlpmnt designed to obtain at the earliest practical date a continuing family of military space vehicles capable of satisfying the needs for space missions as may be determined by Secretary of Defense from time to time. Guidance, stabilization and control components necessary to satisfactory performance of the vehicles shall be included in the scope of this assignment. The SATURN Task and AGENA Task are part of Project TRIBE.

X-15 AF/Navy/NASA

Type: Rocket-Powered Manned Aircraft
prime: North American
power: Thiokol
Obj: Designed to take man in controlable a/c to fringes of outer space—100,000-ft. altitude, at speed of Mach 5 (better than 3600 mph.).

Four successful power flights have now been made. Project lagging.

PROJECT YO YO Navy

Type: Reconnaissance Satellite

★ Satellite for photo. recon. Ship or sub launch.

DETECTION PROJECTS, March 1960

BALLISTIC MISSILE DEFENSE BMEWS AF

Type: Ballistic Missile Defense Radar System
prime: RCA
Obj: Ballistic Missile Early Warning System designed for 40-minute notice of approaching enemy ICBMs.

System to cost around $700 million. Two units ready, one more building. Works with SAGE.

PROJECT DEFENDER ARPA

Obj: Ballistic Missile Defense

ESAR, TRADEX and PINCUSHION are only part of the entire ballistic missile defense program of ARPA. The GLIPAR studies, (Guide Line Identification Program for Anti-Missile Research) is also a part of Project DEFENDER.

ESAR ARPA

Type: Advanced Warning Radar
prime: Bendix
Obj: Electronically Steerable Array Radar is designed for ground installation to warn of approaching enemy missiles. Multitude of individual cells will give more flexibility than other systems of steerable radar.

GLIPAR ARPA

Type: Study Group for Missile Defense
Obj: Designed to work on future ICBM defense. Called upon by DEFENDER and LONGSIGHT.

PROJECT LONGSIGHT ARPA

Type: Study System in Missile/Space Field
Obj: Recommendations as to projects which should be initiated to satisfy future military requirements. GLIPAR (Guide Line Identification Program for Anti-Missile Research) which was initiated. GLIPAR is now used by both LONGSIGHT and DEFENDER. LONGSIGHT more advanced than DEFENDER.

PINCUSHION ARPA

Type: Advanced Radar prime: Raytheon
Obj: PINCUSHION is a many-frequency radar installation to be located on Kwajalein in the Marshall Islands, initially, as an early warning radar of a more variable type than TRADEX or ESAR.

SAGE AF

Type: Continental air warning and control network
prime: IBM
Obj: Provides a push-button missile defense utilizing a search radar system to locate enemy aircraft and destroy them with integrated BOMARC missiles.

TRADEX ARPA

Type: Advanced Radar Prime: RCA
Obj: TRADEX is a modification of the radar types recently designed for BMEWS (Ballistic Missile Early Warning System). It should have better range.

VELA ARPA

Obj: Research, experimentation and systems dvlpmnt related to the nuclear test moratorium.

DATA 1960 SCHEDULE

JANUARY 1960
AIR RESEARCH & DEVELOPMENT COMMAND
Deadline for advertisements: 20 December 1959

FEBRUARY 1960
NAVY BUREAU OF NAVAL WEAPONS
Deadline for advertisements: 11 January 1960

MARCH 1960
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
Deadline for advertisements: 8 February 1960

APRIL 1960
NAVY SUPPLY SYSTEM
Deadline for advertisements: 7 March 1960

MAY 1960
ARMY ORDNANCE CORPS
Deadline for advertisements: 11 April 1960

JUNE 1960
AF AIR MATERIEL COMMAND
Deadline for advertisements: 9 May 1960

JULY 1960
NAVY ANTI-SUBMARINE WARFARE PROGRAM
Deadline for advertisements: 6 June 1960

AUGUST 1960
NAVY ASTRONAUTICS PROGRAM
Deadline for advertisements: 5 July 1960

SEPTEMBER 1960
ARMY SIGNAL CORPS
Deadline for advertisements: 1 August 1960

OCTOBER 1960
ARMY RESEARCH & DEVELOPMENT PROGRAM
Deadline for advertisements: 5 September 1960

NOVEMBER 1960
MUTUAL SECURITY (ICA) PROGRAM
Deadline for advertisements: 3 October 1960

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THE DEPARTMENT OF DEFENSE
Deadline for advertisements: 31 October 1960

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DATA 1960 SCHEDULE

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AIR RESEARCH & DEVELOPMENT COMMAND
Deadline for advertisements: 20 December 1959

FEBRUARY 1960
NAVY BUREAU OF NAVAL WEAPONS
Deadline for advertisements: 11 January 1960

MARCH 1960
NATIONAL AERONAUTICS & SPACE ADMINISTRATION
Deadline for advertisements: 8 February 1960

APRIL 1960
NAVY SUPPLY SYSTEM
Deadline for advertisements: 7 March 1960

MAY 1960
ARMY ORDNANCE CORPS
Deadline for advertisements: 11 April 1960

JUNE 1960
AF AIR MATERIEL COMMAND
Deadline for advertisements: 9 May 1960

JULY 1960
NAVY ANTI-SUBMARINE WARFARE PROGRAM
Deadline for advertisements: 6 June 1960

AUGUST 1960
NAVY ASTRONAUTICS PROGRAM
Deadline for advertisements: 5 July 1960

SEPTEMBER 1960
ARMY SIGNAL CORPS
Deadline for advertisements: 1 August 1960

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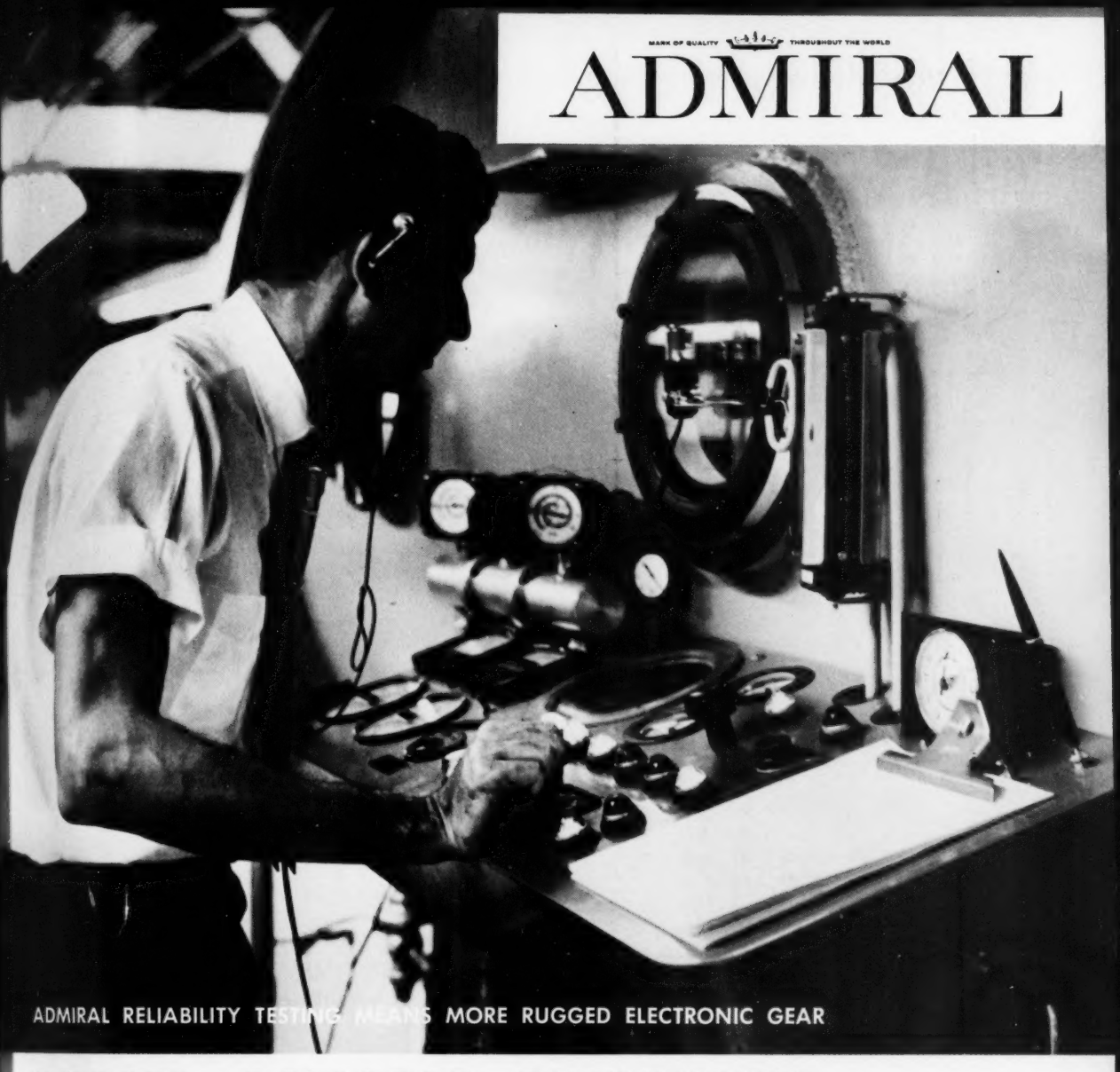

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